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Railway Age

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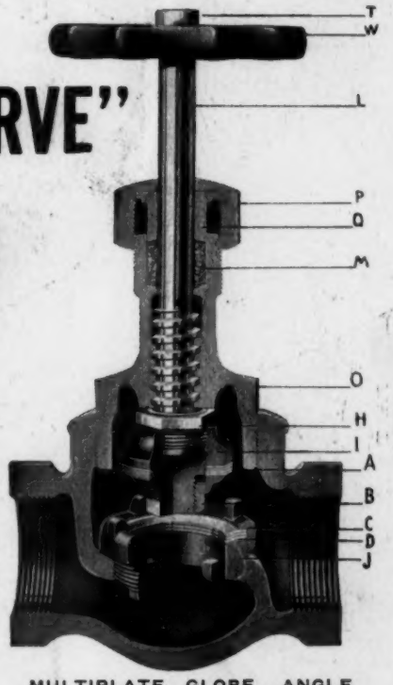

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Alphabetical Index to Advertisements, Page 76 Classified Directory of Advertisers, Page 72

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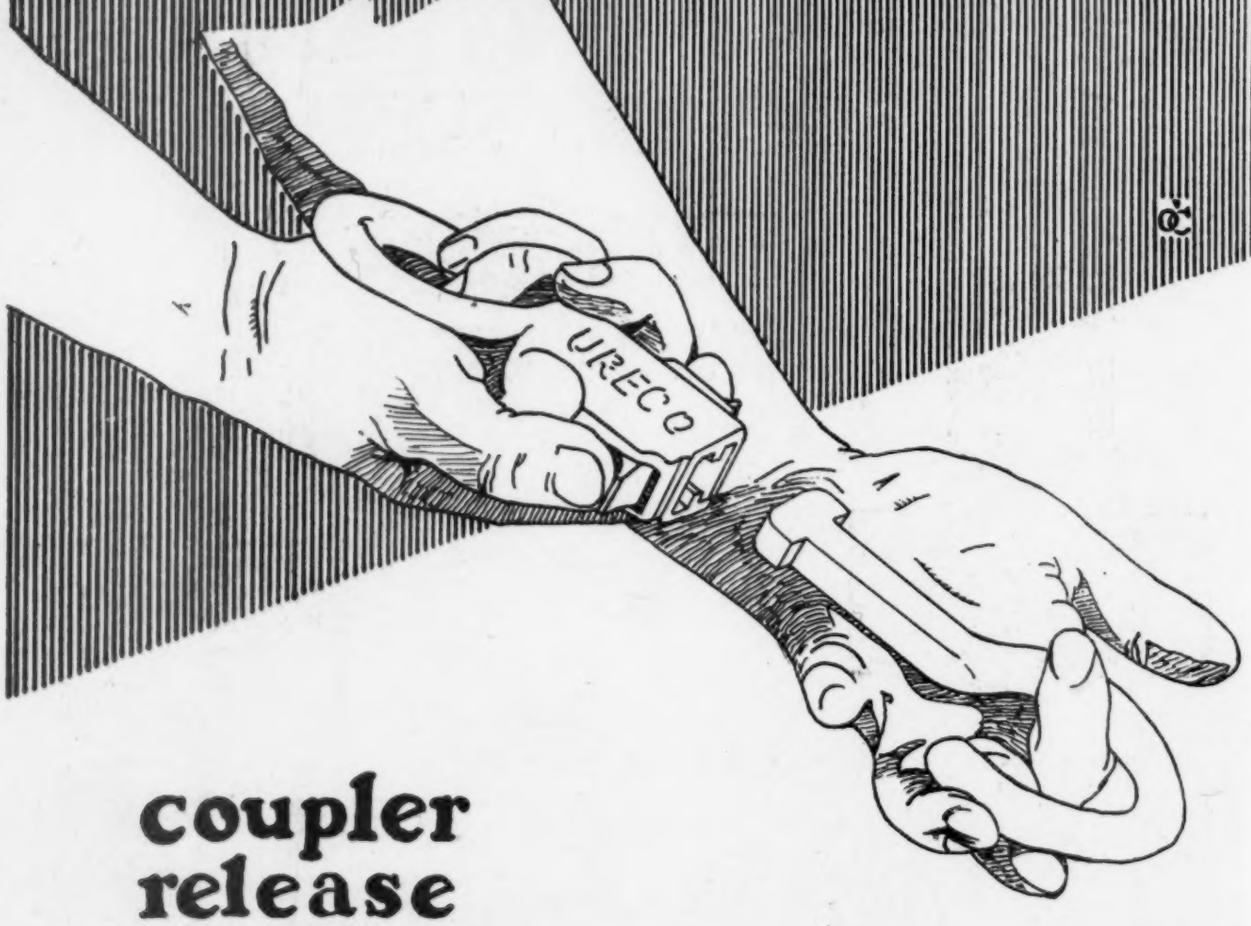

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EDITORIAL

Railway Age

The Table of Contents Will Be Found on Page 5 of the Advertising Section

The fact that "Wall Street" was betting just prior to the election at odds of 12 to 1 on victory for President Calvin Coolidge would have led one to believe that the only thing that could have surprised the financial district would have been a most unexpected reversal. There was no reversal and the betting odds of 12 to 1 proved to be absolutely in line with the decisive character of the President's victory. Nevertheless, Wall Street was surprised. It was surprised by the sudden avalanche of buying orders from all quarters of the country and by a volume of sales that on Saturday broke all records for the short Saturday "session" and on other days proved so great that the tickers reporting the sales continued at work for a half hour or so after the day's sales had been completed. The better part of the stock buying movement for the first few days was in railway shares which promptly advanced in price so that one of the reputable averages of rail stock prices has reached the highest level since 1916, while prices of some few individual railway stocks have reached the highest prices in ten or twelve years. It is not hard to seek the reason for the new and sudden favor for railway stocks. It results because the Progressive candidate had directed much more than a fair share of his political and oratorical thunder at the railroads. The decisive defeat of La Follette and his cohorts has, therefore, been seen by all to remove the radicals as a menace to railway prosperity and to emphasize that majority opinion in this country is in favor of railway well-being and not opposed to it. The favorable situation thus created means a great deal to the railway supply field which serves that industry. That the public should have shown such favor for railway securities as it has in the ten days that have elapsed since the character of the President's victory was made known, means nothing less than that railway financing in the future will be measurably assisted. The railways will be able, therefore, to more easily raise money for the purchase of equipment and for other improvements of all kinds.

Rail Shares Again Popular

No one who has any understanding of human nature will conclude from the results of the election that radicalism in America is permanently dead. Some time again a large body of people will have real or fancied economic grievances and will listen to the witch doctors who offer them various magic cures. Political and economic radicalism is much more complex than most people seem to think. It varies in degree from a relatively mild critical attitude toward existing institutions to rigid adherence to bloody revolutionary dogma. The important point for consideration is, however, that radicalism is essentially a philosophical attitude—a way of looking at life—and can never *of itself* become popular. It does become popular, however—even threatening—when existing conditions give rise to dissatisfaction. Populism became strong, not because of any fervid popular adherence to its abstract principles, but because it was proposed as a remedy for actual dissatisfaction—whether justified or not. It died when the economic condition of those who supported it improved. Your real radical, however, is not like that. He accepts his radical philosophy because of its appeal to his intellectual and emotional nature and is not shaken from it by fluctuations in economic conditions. But if this were all that radicalism involved there would not be enough radicals in the country to dignify their activities by the name of a movement. The danger lies in the fact that the real radicals may find a sufficient number of people who are dissatisfied with their lot and who are therefore willing to lend support to theories which awaken no real fervor in them. The philosophy of socialism and communism makes a particular appeal for the support of the casual laborer. The solution of the problem of unemployment, therefore, would probably go farther toward stopping the spread of these heresies than any other one thing. It is gratifying to see the effort which the railroads are exerting to this end. Similarly from a standpoint of service and rates there must be constant vigilance to keep dissatisfaction at a minimum. We are told by the leader of the radicals that "the fight has just begun." Those opposed to the radical point of view should agree with this statement and proceed with their defense by doing everything in their power to make the existing order of industry as satisfactory and agreeable to all people as it can, by intelligent effort, be made. The railroads, both by actual performance in improving relations with employees and the public and by making their activities known, can do much to minimize the chances of any return of radicalism in strength.

Removing the Causes of Radicalism

The awarding of contracts by the Illinois Central late last week for a 165-mile cutoff between Edgewood, Ill., and Fulton, Ky., involving an estimated expenditure of nearly $17,000,000, launches the largest line construction project, both in mileage and in expenditure, that has been started during the last ten years. It is not without significance that these contracts were not awarded until the results of the election were known, and also that they were let almost immediately thereafter. This award is coincident with the beginning of work by the Southern Pacific on the linking up of its lines in Arizona by the construction of connections aggregating approximately the same mileage and involving an expenditure of more than $14,000,000. Announcement has also been made within the past month that the Pennsylvania is preparing plans for the relocation and reconstruction of its passenger station in Philadelphia which will require the spending of many millions of dollars, while the Southern Pacific has announced that it will spend more than a million dollars in the construction of rail and water terminals at Houston. In considering these projects it should be borne in mind that the present year has been one of relatively active construction. Among the larger projects, the Southern Pacific has proceeded with the construction of its 118-mile cutoff in eastern Oregon which will cost more than $10,000,000, while the Union Pacific has started work on the building of a line from Rogerson, Idaho, to Wells, Nev., approximately 100 miles, and the Central of Georgia has undertaken the reconstruction of its line between Birmingham, Ala., and Columbus, Ga., at a cost estimated to exceed $5,000,000. Since these latter projects are in their

1925 Looks Like a Busy Year

early stages, it is evident that 1925 will be an active construction year. There is further significance to these expenditures. The records of the last two years demonstrate that the railways as a whole have sufficient capacity to handle the present traffic of the country and that while congestions may have developed at certain points, these have been relatively few in number and have exerted no serious influence on the situation in general. If congestion is to be avoided in the future, however, it is important that provision be made in advance for those increases in traffic which may normally be expected. Even more important as a motive prompting the undertaking of improvements is the opportunity to reduce the cost of operation. In its hearing before the Interstate Commerce Commission on the protests of certain communities along its existing line in southern Illinois against the construction of a new line, the Illinois Central showed that the estimated saving in operating expenses resulting from this line would be more than $1,500,000 annually. Improvements of this kind are the kind that can be made in the largest number at the present time, and they are the kind which it is most in the public interest to encourage. These improvements can be encouraged best by giving the railways an opportunity to proceed with the development of their plans with a reasonable assurance that they will be allowed to earn a return sufficient to attract the necessary capital, and to pay a fair return on the investment after it is made. It is the hope of stability in railway legislation for at least two years which is encouraging railway managements to undertake improvements of the character above noted.

What Did the Labor Leaders Accomplish?

NOW THAT THE ELECTION RETURNS are practically all in, the *Railway Age* would give a good deal to know the real thoughts of the railway labor leaders who so largely conducted and financed the La Follette-Wheeler campaign. There is little question about what labor leaders such as W. G. Lee and W. N. Doak, who refused to try to lead the Brotherhood of Railroad Trainmen into politics and who opposed government ownership, are thinking. But what are the thoughts of Warren S. Stone, L. E. Sheppard, D. B. Robertson, W. H. Johnston, B. M. Jewell and others who set out to elect La Follette and Wheeler?

We have often speculated regarding the true reasons why these men began to advocate the Plumb plan and finally in 1924 decided to try their hand at national politics. Our speculations always have led us to the same conclusion—namely, that they had succeeded in "putting over" on the American people so many things that they had become convinced it was a waste of their great talents to devote them to any less dignified and important work than that of running the government of the United States and all that is subject thereto.

They seemed to have grown tired of performing such petty tasks as those involved in the leadership of great railroad labor unions. In consequence, apparently, they decided that they would have the government take over the railroads, and then they themselves would take over the government. Each of them, no doubt, had picked out the place in the President's cabinet that he was going to hold under the La Follette-Wheeler administration.

It is a pity that such a glorious pipe dream had to be followed by the inevitable awakening. What did they accomplish by their expedition into the politics? They helped to accomplish a great deal. They had been bullying Congress for years with the "railroad vote." They succeeded in proving that there is no such vote. It was widely feared that the members of the railway labor unions would vote almost unanimously for La Follette. The election returns show that in this campaign the "railroad vote" was like a Mexican army—mostly generals. The labor leaders deluged the members of the unions with propaganda, but most of the members evidently used it to light the kitchen fire and voted as they pleased.

Another thing Warren S. Stone and his coadjutors succeeded in doing was to help the Republicans carry the western states. The railway labor leaders were mainly responsible for the injection of the issue of government ownership into the political campaign. Now western people, and especially farmers, often have shown a surprising willingness to regulate the railways to death; but even when manifesting the greatest discontent they have never been in favor of government ownership of railways. The opponents of La Folletteism welcomed the issue of government ownership gladly and discussed it fully in the west. They helped to elect Republican and defeat radical candidates in states where it seemed certain that the radicals would win. It helped to beat Magnus Johnson, the farmer-laborite in Minnesota. It almost—if not quite—beat Smith Wildman Brookhart in Iowa.

These labor leaders are truly wonderful politicians. They want to wreck the railways by unfair regulation. If they had let the radicals stick to that program in western territory it might have helped them. But the labor leaders also want the Plumb plan in order that they may sit in the seats of the mighty and run the railways. Therefore, they insisted on injecting this issue into the campaign; and he who runs may read the result.

But one of the most significant results of the election is the light it throws on the effectiveness of the "blacklist" with which the railway labor leaders have been wont to terrorize members of Congress. The most up-to-date scrutiny of the files of their official organ "Labor," shows that they especially marked for destruction 108 members of the House who actually were up for re-election on November 4, and that of these 105 were re-elected. Practically all of these representatives were opposed because they voted against the Howell-Barkley bill at the last session of Congress. The labor leaders through "Labor" also ordered the defeat of 13 candidates for the United States Senate, and all of them were elected. How wonderful are the railway labor leaders! What tremendous power they have in politics! Apparently, the principal thing a candidate for Congress needs to ensure his election is to have the railway labor leaders openly oppose him.

Warren S. Stone has now called a meeting of labor leaders to decide what steps they shall take to get the Howell-Barkley bill passed at the next session of Congress. We offer them a suggestion which we think well worthy of consideration. This is, that they oppose the bill. In view of the results of the election it would seem that this would be the surest way to get it passed.

It used to be considered the principal function and duty of labor leaders to seek good working conditions and reasonable wages for the members of the unions. During the last five years most of the railway labor leaders have been devoting most of their time, skill and energy to trying to destroy the value of the railways which employ the members of the unions. They have advocated the Plumb plan of government ownership. In their endeavors to promote it they have, with amazing industry, spread broadcast the most unfair and mendacious attacks upon the railways and their management that have ever been made upon any industry and its management. There has been no misrepresentation too petty or too egregious for them to espouse and disseminate. For example, we have just been reading a book on "Industrial Democracy" by the late Glenn E. Plumb which contains as a foreword the autographical endorsements of the labor leaders who have supported the Plumb plan. In this book,

which we suppose has been widely distributed among railway employees, the statement is repeatedly made that the actual investment in the railways and their actual value do not exceed $10,000,000,000. This statement is absolutely without any foundation in fact. It is a pure fiction. It is much less than one-half of the up-to-date tentative valuation placed upon the railways by the Interstate Commerce Commission, plus the investment since made. These labor leaders know that it is a misrepresentation which is reckless and indefensible.

Furthermore, they originated and persistently have given currency to the assertion that the Transportation Act "guarantees" the railways a fixed return upon their valuation, although every person who ever read the Transportation Act knows that the statement is false.

The purpose of their propaganda has been to discredit and breakdown private management and thereby pave the way for the adoption of the grotesque and absurd Plumb plan. The results of the recent election show that, in spite of all their efforts to promote government ownership, an overwhelming majority of the people are still opposed to that policy. The only result of their propaganda has been to make it harder for the railways to get fair regulation. But, if private ownership is to be maintained, fair regulation is as necessary for railway employees as it is for railway owners.

Unfair reductions of rates, which most railway labor leaders persistently have tried to bring about, would force the railways to seek reductions of wages. If they got them, railway employees would be the losers. If they did not get them, the railways, in efforts to save themselves from bankruptcy, would lay off many thousands of employees, and these employees would share with railway security-owners in the losses caused by the policy of their labor leaders.

As long as the railways are privately owned and managed, every effort that is made unfairly to discredit their managements or to secure reductions of rates that will tend to prevent them from earning a fair net return, will be indirectly an attack upon the welfare of their employees.

The recent election shows that the agitation of the labor leaders for government ownership is not having directly the slightest tendency to create public sentiment for that policy. How long will the members of the unions continue to support leaders whose political activities are making national jokes of them and whose propaganda against fair regulation of the railways is absolutely contrary to the best interests of railway employees?

How Co-operation Has Improved Service

FOR TWO YEARS now the railways have handled the fall "peak load" of a record breaking freight business without any car shortage. This was an achievement in 1923, but the achievement of 1924 is even more creditable. In 1923 the peak load did not greatly exceed the load that had been carried for some time previously. As early as in May, 1923, the weekly loading of cars reached 1,014,029, and the "peak load" of the week ended September 29 was 1,097,493 cars, representing an increase in loading since May of only 83,464 cars. In the week of the "peak load" in 1923 the railways had a surplus of cars in serviceable condition of 41,745.

Widely different has been the transportation problem of 1924. Traffic in the spring and summer months was much lighter than in 1923, total car loadings in the last week of May being only 918,213. The "peak load" reached in the week ended October 25 was 1,112,345 cars, an increase since May of 194,132 cars. The increase in loadings between May and the week of the "peak load" in 1924 was almost 111,000 cars more than in 1923. Nevertheless, in the week when the "peak loading" was reached in 1924 the railways had a surplus of 99,952 serviceable cars.

The marked success with which the largely increased traffic of the fall of 1924 has been handled is largely due to the many thousands of new locomotives and cars which the railways have installed in service within the last two years and to improved operating methods.

There is another very important reason for it, however, upon which too much stress cannot be laid. This is the co-operation the railways have been given by all classes of shippers through the Shippers' Regional Advisory Boards which have been organized in all parts of the country.

These boards are composed entirely of shippers and of representatives of shippers, such as members of state railroad commissions. Each of them is organized into committees which are composed of representative shippers of different classes of commodities. The committees of the Regional Shippers' Boards constantly keep in touch with the shippers of the various classes of commodities that they represent and also with the officers of the individual railways and the regional managers of the Car Service Division of the American Railway Association. By this means the railways are kept advised regarding the transportation needs of the shippers of every class in every territory, which, of course, helps them to distribute cars equitably between shippers, and at the same time to get the maximum service from cars.

While there has been no substantial shortage of cars in any part of the country this year, it would be a mistake to assume that the transportation problem that has been presented to the shippers and the railways has not been a difficult one. It has been an especially difficult one in some territories. This has been particularly true in the western grain belt. There can be little doubt that if it had not been for the close co-operation between the Regional Shippers' Boards and the officers of western railways within recent months there would have been serious congestions and, in consequence, "car shortages" in certain sections. In fact, since the total number of serviceable cars reported in October was less than 4 per cent of the total number available it is not improbable that a substantial "car shortage" would have occurred if the operating efficiency of the railways had not been at its height and there had not been such close co-operation between them and the Shippers' Regional Boards.

In an address delivered this week before the annual convention of the National Association of Railway and Public Utilities Commissions at Phoenix, Arizona, Donald D. Conn, manager of the Public Relations Section of the Car Service Division of the American Railway Association, pointed out clearly that two distinct classes of problems arise in the relations between the shippers and the railways. Problems of one of these classes, such as the basis upon which railway rates must be regulated, must be dealt with by law. There is, however, as Mr. Conn indicated, another class of problems which really cannot be solved by legislation or any form of regulation. For example, no kind or amount of legislation, or of regulation by any public body, could have solved the transportation problem presented to the shippers and railways this fall as it has been solved by the cordial co-operation of the two interests directly concerned.

It is a question well worth considering whether by closer co-operation the railways and the shippers could not bring about a more satisfactory solution of some problems which are now dealt with almost solely through hearings before the Interstate Commerce Commission. Might it not be possible, for example, for the Shippers' Regional Advisory Boards and the railways sometimes to study co-operatively questions of rate adjustment and agree upon recommendations which would be welcomed by the Interstate Commerce

Commission? After all, the matters of railway service regarding which they have been co-operating and the question of what rates the railways must be allowed to charge in order to enable them to provide adequate transportation facilities, are closely interlocked. The most equitable distribution and efficient use of cars will not enable the railways to handle satisfactorily the traffic offered unless they are allowed to earn enough to buy enough cars and locomotives and to provide the tracks and terminals needed.

Books and Articles of Special Interest to Railroaders

(Compiled by Elizabeth Cullen, Reference Librarian, Bureau of Railway Economics, Washington, D. C.)

Books and Pamphlets

The Air-Craft Yearbook 1924, compiled by the Aeronautical Chamber of Commerce of America, Inc. The discussion of and statistics on the growth of commercial aviation may be of interest. 390 p. Pub. by Gardner Pub. Co., Inc. New York City. $5.25

Programme of Improvements and New Works, New Zealand Railways, 1924, by J. G. Coates, Minister of Railways. 17 pages, 27 maps and graphs. Pub. by W. A. G. Skinner, Govt. Printer, Wellington, New Zealand. 3s. 6d.

Railroad Facts to Think About. The N. C. & St. L. presents definite data about itself, and railways generally. Illustrated. 14 p. Pub. by Nashville, Chattanooga & St. Louis Ry. Co., Nashville, Tenn.

The Taxation of Railroads in Maine. November 1, 1924. 19 p. Pub. by Maine Central R.R., Portland, Me.

A Dictionary of Electrical Terms for Electrical Engineers and Students, by Samuel R. Roget. 302 p. Pub. by Sir. I. Pitman, New York and London. $2.25.

Periodical Articles

Chances for Railroad Development. Editorial comment on railroad extension, and the prospects of the railway material industries. Iron Age, November 6, 1924, p. 1218.

Communication for Utilities. The work of load dispatchers in power systems, and the development of "carrier current telephony" as an aid. United States Investor, November 8, 1924, p. 16-17.

Exposing the Farm Problem, by Garet Garrett. Psychological as well as physical phases considered, including the attitude towards the Transportation Act. Saturday Evening Post, November 8, 1924, p. 3-4, 161-70.

Grave Is Gay: As a Fan with the Giants and the White Sox. The cartoonist refutes the statement in the programs for the ball-games in England to the effect that an American invented steam railroad motive-power, with "slightly historical" drawings of Watt, Trevithick and George Stephenson. Illustrated Sporting and Dramatic News [London, England], November 1, 1924, p. 286.

Isolation Vanquished, by Thomas R. Reed. A review of efforts towards closer communication between the East and West coasts of America, resulting in the Pony express, the transcontinental railroads, the Panama Canal, and finally air service. U. S. Air Services, November, 1924, p. 33-38.

Ten-ton Milk Cans, by Edward Hungerford. Container system of handling milk. Country Gentleman, November 8, 1924, p. 4, 16.

This Engineer Traded an Income for Opportunity, by Samuel Crowther. W. S. Murray, formerly of the New Haven, now head of the Super-power survey. American Magazine, November, 1924, p. 36-37, 152-156.

The Traffic Department of a Great Mail Order House, by A. B. Schmidt. Some account of the carloads and truckloads of things handled daily by Sears-Roebuck. Trade and Transportation Bulletin, November, 1924, p. 1-2.

Articles in November Railway Mechanical Engineer

Bored Pins and Axles for Locomotives, by Lawford H. Fry. Shows how increased strength with less weight can be obtained by using larger inside diameters. Page 667.

Economy in Painting Steel Passenger Cars, by G. H. Hammond, foreman painter, Minneapolis, St. Paul & Sault Ste. Marie. Gives the result of 12 years' experience in the use of the four-coat system of finishing the outside surfaces. Page 672.

Discussions at the Car Inspectors' Convention. Contains answers of the Question Box Committee of the Chief Interchange Car Inspectors & Car Foremen's Association, to 60 questions pertaining to the application of the A.R.A. Rules of Interchange. Page 675.

A. C. L. Rebuilds Ventilated Box Car in 6½ Hours. An account of the method followed in completely overhauling a car in a total labor time of 61¼ man-hours. Page 681.

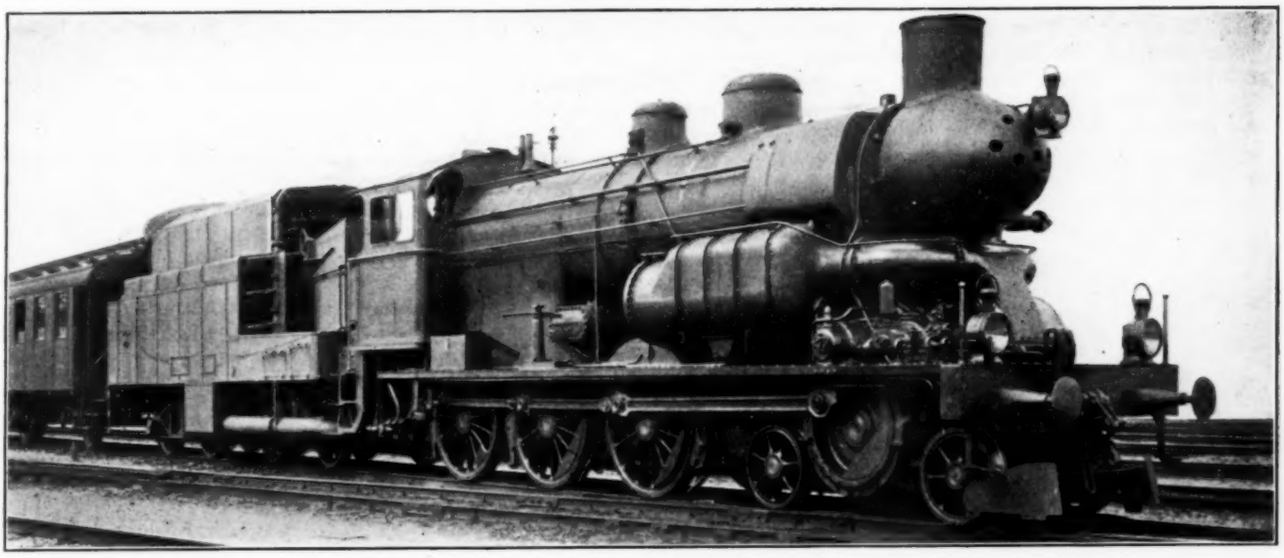
New Books

The Problem of Business Forecasting. Edited by Warren M. Persons, William Trufant Foster and Albert J. Hettinger, Jr. No. 6 of the publications of the Pollak Foundation for Economic Research. 311 pages. Illustrated with charts and diagrams. Size 5 in. by 8 in. Bound in cloth. Published by Houghton Mifflin Company, Boston, Mass. Price $4.00.

This book is a collection of the papers presented at the eighty-fifth annual meeting of the American Statistical Association at Washington, D. C., on December 27-29, 1923. Railway men who may have been impressed with the arguments that have been presented in the *Railway Age* or elsewhere about the desirability of engaging in a study of the possibilities of forecasting in connection with railway management control will find this book valuable. The subject of forecasting generally is too new to have permitted the building up of a very extensive literature on it. This is one of the few important books that have thus far been made available.

The book has two chapters dealing directly with railroads. Chapter V, entitled "Forecasting Railway Traffic" is an address by R. H. Aishton, president of the American Railway Association, supplemented by discussion by Dr. J. H. Parmelee, director of the Bureau of Railway Economics. Chapter VI, entitled "Fluctuations in Railway Traffic," is a study prepared by Dr. David Friday and L. E. Peabody, associated with the National Transportation Institute.

Several of the chapters relating respectively to certain industries discuss the business statistics available and the need for more accurate statistical data in the industry. The railway man, as he reads, cannot but be impressed by the contrast to his own industry in which statistics of all kinds are available and in practically every case extending sufficiently far back to meet the utmost requirements for a study of the long time trend of the industry. Favorable mention is also made of the car loadings figures reported by the Car Service Division. The most striking reference is that made by Charles O. Hardy of the Institute of Economics in a chapter entitled "An Example of Business Forecasting." In his forecast, Mr. Hardy used the car loadings figures and of them he says, "Car loadings constitute, in my judgment, the most dependable single indicator of the activity of business." Few industries are as well provided with the statistical data needed for purposes of forecasting as is railway transportation; in fact one of the best of any of the indexes available in any industry is the railroads' own weekly car loadings report.



Standard 2-6-0 Reciprocating Type Converted into a Turbine-Driven Condensing Locomotive by Escher Wyss & Co., and the Swiss Locomotive Works

Zoelly Turbine-Driven Condensing Locomotive

Tests Show Low Water Consumption—A 50 Per Cent Saving in Fuel is Claimed

By H. Zoelly
Chairman, Escher Wyss & Co., Zurich, Switzerland

A MOGUL TYPE reciprocating locomotive belonging to the Swiss Federal Railways has been successfully converted into a turbine-driven condensing locomotive by Escher Wyss & Co., Zurich, Switzerland, in conjunction with the Swiss Locomotive Works, Winterthur. The principal change, in general appearance, as compared with the original locomotive has been the replacement of the cylinders by a turbine. The original boiler, equipped with a Schmidt superheater, has been provided with a turbine-driven fan arranged in the front part of the smokebox as a substitute for the draft produced by the exhaust steam of the reciprocating engine.

The Main Turbines

The new locomotive was constructed for the same performance as the old one, so that the six-stage impulse Zoelly turbine for running ahead was designed to give 1,000 hp. at the crankpin. The back-up turbine consists of a simple compound wheel and is contained in the same casing as the ahead turbine. The turbine rotor, comprising both the ahead and back-up wheels, is made out of a solid block, the blades being inserted in slots in the wheel rims. The turbine drives through a double-reduction gear (the first reduction 1:7 and the second 1:4.1), a jack-shaft carrying the crank-pins and the drive to the wheels being obtained by connecting rods.

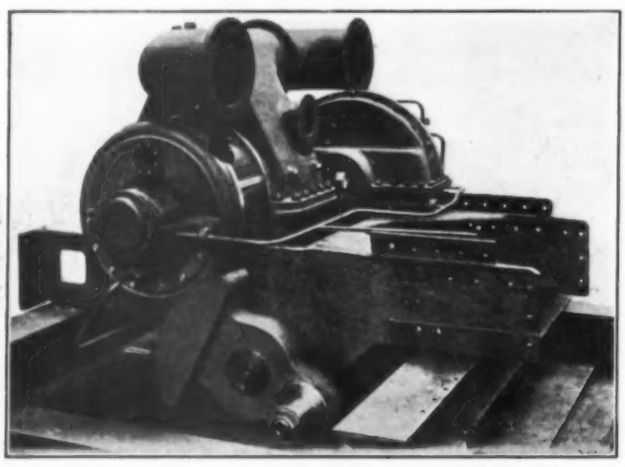
The turbine casing with the reduction gear, intermediate shaft, jackshaft, and all bearings are mounted on a one-piece steel casing which is riveted to the locomotive frames. The turbine is placed in front of the boiler, its axis parallel to the locomotive axles.

Steam admission to the ahead or back-up turbines is controlled by valves which are operated from the enginemen's cab. For running ahead two groups of nozzles have been provided in the first guide wheel, one allowing the passage of about 11,000 lb. of steam when fully open, and the other for 4,400 lb. One or the other of the valves, or both, is fully open, according to the load. Intermediate quantities are obtained by throttling with the main governing valve. Only one valve which allows a total of 15,500 lb. of steam to pass, has been provided for running backwards. Smaller quantities are likewise obtained by throttling down with the main governing valve. The efficiency of the back-up turbine is lower than that of the ahead turbine for a locomotive usually runs ahead. Backing up is only provided for switching, manouvering, or for use in cases

THIS article is an abstract of a paper prepared by Dr. Zoelly for presentation before the annual meeting of the Railroad Division of the American Society of Mechanical Engineers, which will be held in the Engineering Societies' building, New York, on Tuesday, December 1, at 2:00 p.m. The paper also appears in the November issue of Mechanical Engineering, published by the society. The experimental locomotive here described is a converted reciprocating type in which the cylinders were replaced by the turbine and jack shaft, and the tender replaced by a condenser cooling water recooler. The turbine is rated at 1,000 hp.

of emergency where a smaller amount of power is required.

The maximum traveling speed of the locomotive is 47 miles per hour and is limited by the type of locomotive. The driving wheels have a diameter of 60 in. At 47 m.p.h. the turbine makes 7,500 r.p.m. The turbine speed is of course, proportional to the traveling speed. When running ahead the back-up wheel rotates in a vacuum, as is common practice in marine propulsion. The wheel friction for the simple



The Turbine Casing and Balanced Crank

back-up turbine is small, and the losses are therefore insignificant.

The Condensers and Auxiliaries

The steam passes in about equal quantities from the exhaust end of the turbine, in both the ahead and the back-up turbines, to condensers placed longitudinally on each side of the boiler. These condensers are water cooled and are of the surface type.

All auxiliaries of the condensing plant are driven by one small turbine which revolves at 9,000 r.p.m. This speed is reduced to 1,200 r.p.m. through a reduction and bevel gearing and drives a vertical shaft carrying the circulating-water, air, and condensate pumps. The circulating pump takes water from the tender and forces it through the condensers and back again to the recooler. The air pump discharges at a pressure of about 75 lb. to a water-jet air ejector which communicates with the two condensers. It is designed so that the air in the air separator can escape into the atmosphere and the water return to the suction side of the circulating pump.

The condensate from the condensers is led to the condensate pump, which latter discharges at about atmospheric pressure into the feed pump. The latter is placed on the side platform of the locomotive. It is a reciprocating pump running at 59 r.p.m. and is driven through a second reduction from the auxiliary turbine. The feed pump discharges directly through a heater into the boiler.

The auxiliary turbine is a three-stage Zoelly impulse turbine connected to the condenser and receives steam at 11 lb. gage pressure. Exhaust steam is used in this turbine from a back-pressure turbine which drives the ventilator of the recooler.

The Forced Draft Fan

Special means had to be provided for producing the firebox draft, as the exhaust steam was no longer available. The locomotive was first equipped with a forced draft for producing pressure under the grate. After a long series of tests, however, it was found necessary to change over to the suction principle.

The fan is of the centrifugal type, provided with a spiral casing, and is capable of producing a vacuum in the smokebox of 8.2 in. of water. A maximum of 280 cu. ft. of flue gases can be discharged per second when running at 1,500 r.p.m. The fan is driven by a small turbine through a gear with a transmission ratio of 1 to 6. The turbine receives live steam and exhausts with a back pressure of about 7 lb. gage to the feedwater heater. The admission of steam to the turbine is regulated by a valve which is also operated from the enginemen's cab. The exhaust steam from the turbine which drives the fan is passed into the heater as there is a certain ratio between the quantity of feedwater and the exhaust steam from that turbine. If for some reason there should be no water in the heater and the steam could not condense, a safety valve opens a connection from the heater to the condenser. The condensate of the heater steam always escapes directly to the condenser and thus goes to the boiler along with the condensate of the main circuit.

This design lacks the advantage of the usual draft producer, i.e., the proportioning of the draft to the quantity of steam required in the main turbine. This, however, can be

TABLE I—COMPARATIVE STEAM AND COAL CONSUMPTIONS OF DIFFERENT LOCOMOTIVE TYPES

	Piston locomotives, non-condensing				Piston locomotives, condensing. Superheated-steam			Turbo locomotive. With feedwater heating		
	Superheated-steam simple 2-cyl.		Superheated-steam 4-cyl. compound							
	Without preheating	With preheating	Without preheating	With preheating	Simple. Without preheating	Compound. With preheating	Without preheating	With steam	With smoke gases	Preheating feedwater and combustion air
Boiler pressure, lb. per sq. in, abs..	213	213	213	213	213	213	213	213	213	213
Pressure at steam chest, lb. per sq. in. abs.	199	199	199	199	199	199	199	199	199	199
Temperature in steam chest, deg. fahr.	572	572	572	572	572	572	662	662	662	662
Exhaust pressure, lb. per sq. in. abs.	14.2	14.2	14.2	14.2	2.13	2.13	2.13	2.13	2.13	2.13
Steam per i.hp.-hr. (including all auxiliaries), lb.	16.97–16.28	16.97–16.28	16.5–15.61	16.5–15.61	13.83	11.55	10.59	11.08	11.08	11.08
Saving in steam consumption compared to simple locomotive working with superheated steam, non-condensing, lb.	0	0	0.47–0.67	0.47–0.67	3.14–2.45	5.42–4.73	6.38–5.69	5.89–5.20	5.89–5.20	5.89–5.20
Do., per cent	0	0	2.76–4.1	2.76–4.1	18.5–15.1	31.9–29.0	37.6–35.0	34.7–31.9	34.7–31.9	34.7–31.9
Total heat required in boiler per hp.-hr., B. t. u.	44,860–41,680	33,830–32,470	36,850–34,880	32,910–31,140	30,410	25,510	20,120	19,510	17,980	16,410
Coal consumption (heating value of 11,700 B. t. u. assumed), lb. per hp.-hr.	3.23–3.10	2.88–2.77	3.14–2.97	2.81–2.52	2.60	2.18	1.72	1.67	1.54	1.40
Saving in coal compared to a simple locomotive working with superheated steam and feedwater heating, lb.	—0.35 to —0.33	0	—0.26 to —0.20	0.07-0.25	0.28–0.17	0.70–0.59	1.16–1.05	1.21–1.10	1.34–1.23	1.48–1.37
Do., per cent	—12.4 to —12.1	0	—9.3 to —8.9	2.43-8.9	9.3–5.65	24.1–21.0	40.0–38.0	41.8–39.5	46.5–44.4	51.1–49.2

realized on condensing locomotives by bleeding steam from the main turbine.

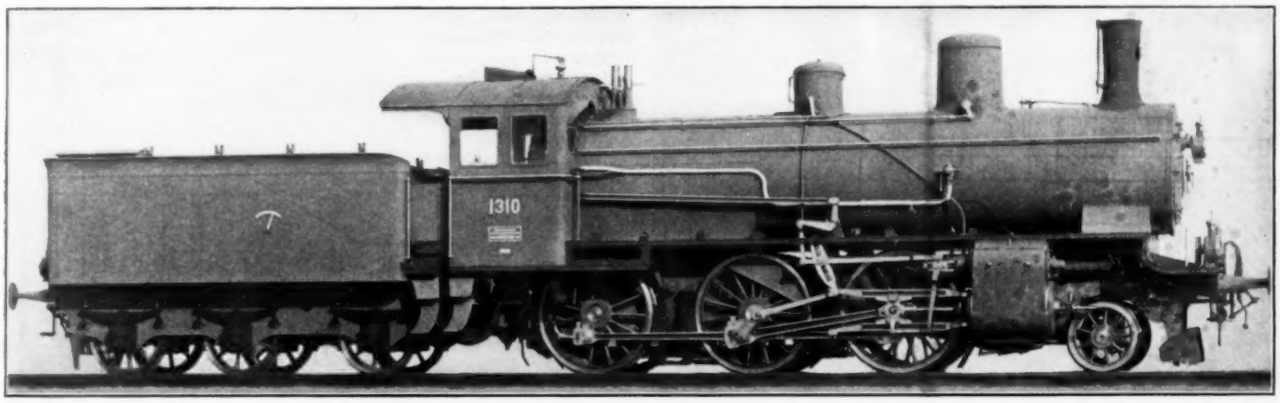
Air Pump for the Automatic Air Brake

The design of the Westinghouse air pump does not quite suit the different operating conditions of the turbine locomotive as the exhaust steam is lost and cannot be used on account of the oil it contains. In future designs the natural course will be to employ a rotary pump, which can be driven by the same auxiliary turbine that drives the condensing auxiliaries, thus returning all steam to the boiler.

The Boiler Feedwater

Theoretically the condensing locomotive does not need any additional water for boiler feeding, as the water in the boiler is working on a closed circuit. It is practically impossible, however, to eliminate leakage losses, loss through the steam whistle, and last but not least, loss through train heating. In order to obtain full advantage from the condensing locomotive it is essential that none other than clean soft water gets to the boiler. This can be assured in two different ways. It is possible to have a special tank for boiler feedwater on the tender, the feeding being effected by an injector as in the case of the ordinary locomotive, or water from the cooling-water tank may be used, which should be treated before being sent to the boiler. The Krupp Company, Essen, Germany, which holds a Zoelly license, cleans the make-up water by sending it to a small evaporator. The feedwater evaporated in the evaporator escapes into the condenser, where it condenses and it is then sent to the boiler along with the condensate of the main circuit. Instead of leading the steam from the evaporator direct to the condenser, it is also possible to send it to a low-pressure turbine, or to a certain stage of the machine, thus doing useful work.

Neither of these two solutions has been resorted to on the experimental locomotive. The cooling water is used direct for boiler feeding, and is fed by the steam injector when necessary.



The Original Locomotive Before Its Conversion to Turbine Drive

System of Lubrication and Recooling

Each turbine has its own lubricating system, comprising an oil tank and a geared pump driven from a shaft of the reduction gear. Gears and bearings are under forced lubrication, the oil for the main turbines passing through an oil cooler which is connected with the cooling-water circuit of the condensers.

The most vital part of the condensing locomotive, working with water as a refrigerating medium in the condenser, is the recooler. All the heat units taken from the steam in the condenser go to the cooling water, which of course, has to be recooled in order that it may be used in a cyclic process. The recooler is a separate vehicle, taking the place of the usual tender, and it provides room for coal and make-up water for boiler feeding. It works on the vaporization principle, air being brought into intimate contact with the water to be cooled, which heats it and saturates it with water vapor. The heat to be absorbed in such manner is enormous, amounting in the case of the 1,000-h.p. experimental locomotive to about 5,760,000 B.t.u. per hour, and increasing in proportion for larger locomotives.

The recooler comprises a certain number of water and air elements working in parallel. Each element consists of a wrought-iron channel of rectangular cross-section. This channel is divided diagonally into two halves in the longitudinal direction by means of perforated trays containing Raschig rings; i.e., small tubes of about equal length and diameter. The water to be cooled is led to these trays by tubes which act as sprayers, the air passing in counterflow. The cooling elements are so disposed that the natural current of air produced by the traveling train can enter the cooling element direct. A fan produces a sufficient current of air when the train is stationary or traveling at a very slow speed, and also augments the normal current when traveling at ordinary speeds. It is driven through a gear by a small back-pressure turbine, as previously mentioned. Admission of steam to the turbine is controlled by means of a valve from the enginemen's cab.

The cooled water flows from the cooling element back into a tank, whence it is again drawn into the circulating pump. As a certain amount of water is evaporated in the process it becomes necessary to add a corresponding amount in order to keep the circulating quantity constant. There is provided, for this purpose, a large storage tank on the tender, which communicates with a suction tank by means of floaters. The water in the tender need not necessarily be pure as it does not enter the boiler nor come into contact with such parts as could seriously affect the working of the plant.

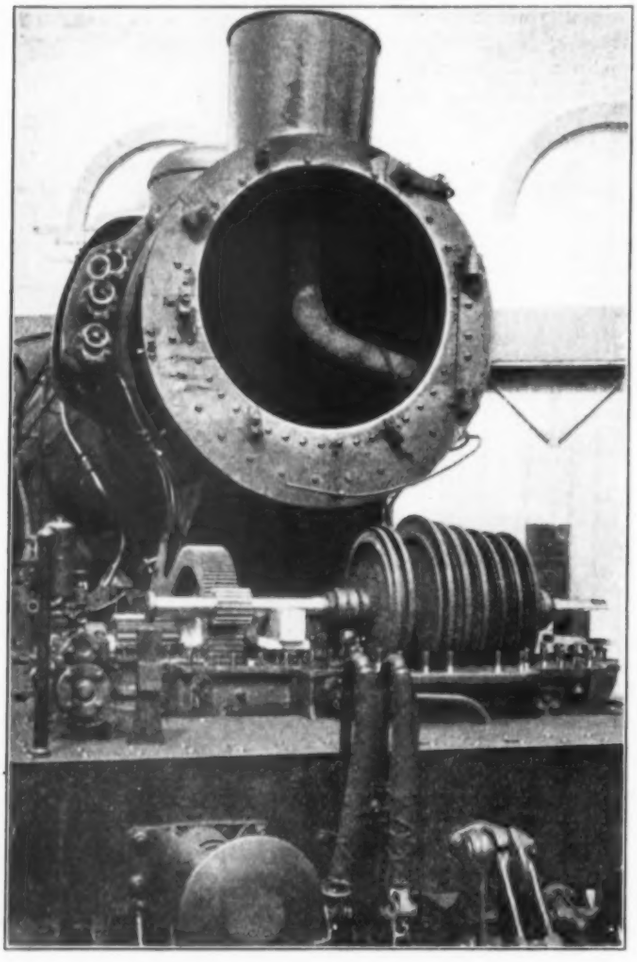
Space is provided in the tender for 11 tons of coal and 1,440 gals. of water.

The recooler car and locomotive are coupled in the usual way. The connections for both the suction and discharge pipes of the cooling-water system are made by means of sliding ball-and-socket joints. These joints allow the tender to be uncoupled from the locomotive upon removing the coupling bolts. Connections for live and exhaust steam from the turbine which drives the fan of the recooler are only of small dimensions and are made by flexible pipes.

Economies Shown by Tests

Tests have been conducted with this experimental locomotive, but only over a line of 35 miles which had variable grades. This made it impossible to make coal-consumption tests. All that could be determined was the steam consumption, which may be compared with that of a corresponding

reciprocating locomotive making the same journey with the same load. Preheating was employed on the turbo-locomotive and only saturated steam was used for the auxiliaries. The consumption of heat in the turbo-locomotive for the round trip was only 4,230,000 B.t.u. An ordinary locomotive with the same train and identical operating conditions, will consume 5,904,000 B.t.u., calculated from the difference in water levels in the tender before and after the run and the initial steam conditions. These tests were repeated four times and the averages are given in Table I. The water consumption of the recooler was approximately 1,400 gals.



The Rotor and First Reduction Gear of the Zoelly Locomotive

Quite a large amount of this water represented mechanical losses through leakage.

Operation and Maintenance is Comparatively Simple

In spite of the numerous parts comprising a turbo-locomotive, its operation is simple and less attention is required on the part of the personnel than is the case with the ordinary reciprocating locomotive. Before starting the locomotive the engineer speeds up the turbine driving the fan on the recooler.

This turbine is connected in series with the turbine driving the condensing auxiliaries and the condensing plant is started automatically. After the proper working vacuum has been attained, which requires several minutes, the steam-admission valve to the main turbine is opened wide and then it is only necessary to open or close the governor valve in order to start or stop the train. The exhaust fan should also be started as soon as the engineman starts to work the locomotive. The opening of this valve is governed in such a way that the boiler pressure is kept constant. Boiler feeding requires no attention from the engine crew, except to see that the pump is working properly. All that is required to keep the locomotive going at a certain speed is simply to throttle the steam admission to the required extent. If for any reason the output is insufficient when the governor valve is wide open, then the overload valve will allow an increase. The auxiliaries should not be shut down unless for a prolonged stop.

In order to run the locomotive backwards the valve for running ahead is closed and that for running astern is opened. The engineman then operates the governing valve as before.

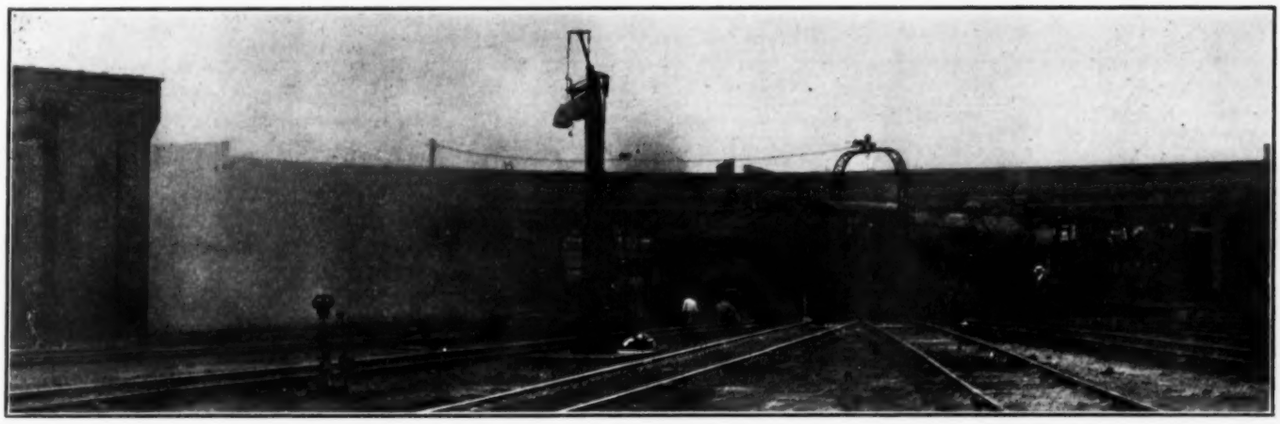
The locomotive makes a smooth start which seems to contradict the opinion expressed by many engineers that a turbine-driven locomotive would not have sufficient initial torque to start a train. The running of the turbine-driven locomotive is smooth when compared with that of a reciprocating locomotive. Dynamometer tests taken on the Swiss Federal Railways showed that the pull at the drawbar was free from fluctuations.

TABLE OF DIMENSIONS, WEIGHTS AND PROPORTIONS

Railroad	Swiss Federal Railways
Builders	Escher Wyss & Co., Zurich, Switzerland. Swiss Locomotive Works, Winterthur, Switzerland.
Service	Experimental
Turbine	6-Stage impulse Zoelly
Maximum speed, running ahead	7,500 r.p.m.
First gear reduction	1 to 7
Second gear reduction	1 to 4.1
Maximum speed	47 m.p.h.
Weights in working order:	
Total engine	130,000 lb.
On drivers	91,200 lb.
Wheel bases:	
Driving	12.3 ft.
Total engine	25 ft.
Total engine and tender	58.4 ft.
Wheels, diameter outside tires:	
Driving	60 in.
Front truck	33 in.
Boiler:	
Type	Conical
Steam pressure	200 lb. per sq. in.
Superheat	662 deg. F.
Fuel, kind	Bituminous
Grate area	25 sq. ft.
Heating surfaces:	
Firebox and combustion chamber	132.5 sq. ft.
Tubes and flues	927.5 sq. ft.
Total evaporative	1,060 sq. ft.
Superheating	380 sq. ft.
Comb. evaporative and superheating	1,450 sq. ft.
General data estimated:	
Turbine horsepower	1,000 hp.

A further development of the turbine-driven locomotive is at present impending which involves the employment of very high pressures. The practical utilization, however, depends upon the finding of a suitable boiler. As far as the turbine itself is concerned, the designs are ready.

The advantages of the turbo-locomotive are many. Some of them are, high economy in fuel, amounting to nearly 50 per cent; low water consumption and the water not necessarily being good boiler water; the boiler can be kept clean, and smooth running conditions obtained on account of the absence of reciprocating parts. It is predicted that the turbine-driven locomotive will soon enter into successful competition not only with the reciprocating locomotive but also with plans for electrification which are expected to result in greater efficiency in the utilization of coal. Its greater economy gives increased capacity with the same boiler and thus opens a new era of steam-locomotive traction.

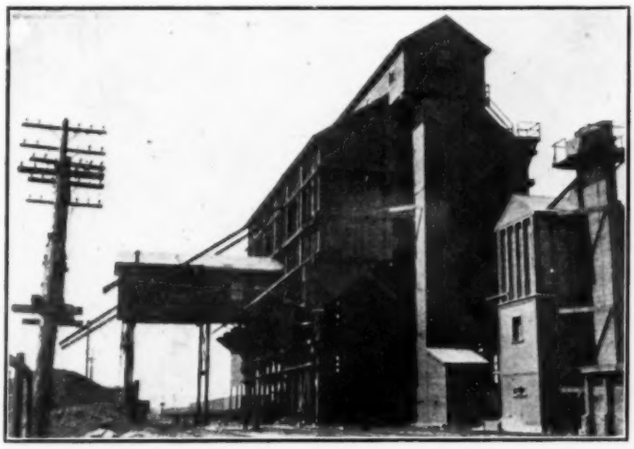


Modern Facilities Are Installed at Rigby Terminal

Portland Terminal Facilities Are Modernized

New Rigby Yards and Engine Terminal Expedite Freight Movement Through Maine

TO IMPROVE TRANSPORTATION conditions in the state of Maine, the Portland Terminal Company, a subsidiary of the Maine Central, has recently expended nearly $2,000,000 for new facilities at Rigby, South Portland, Me. These facilities include primarily two new yards, one for handling east and the other westbound freight, and a 40-stall brick enginehouse, intended to accommodate both freight and passenger power. Other units of these modern engine terminal facilities include a 2,000-ton coal shed, four ash-pits equipped with pneumatic hoists, two 75,000-gal. water tanks, an engine washing shed and a six-track car repair yard. The improvement plans also called for a 1,600-ft. double track trestle and fill over the Fore river for connecting freight lines. All of this construction work was completed under pressure in a period of seven months in order that the improved transportation facilities might be made available as soon as possible and before interruption by freezing weather. Rigby is now the largest freight terminal in Maine and one of the most important in New England.

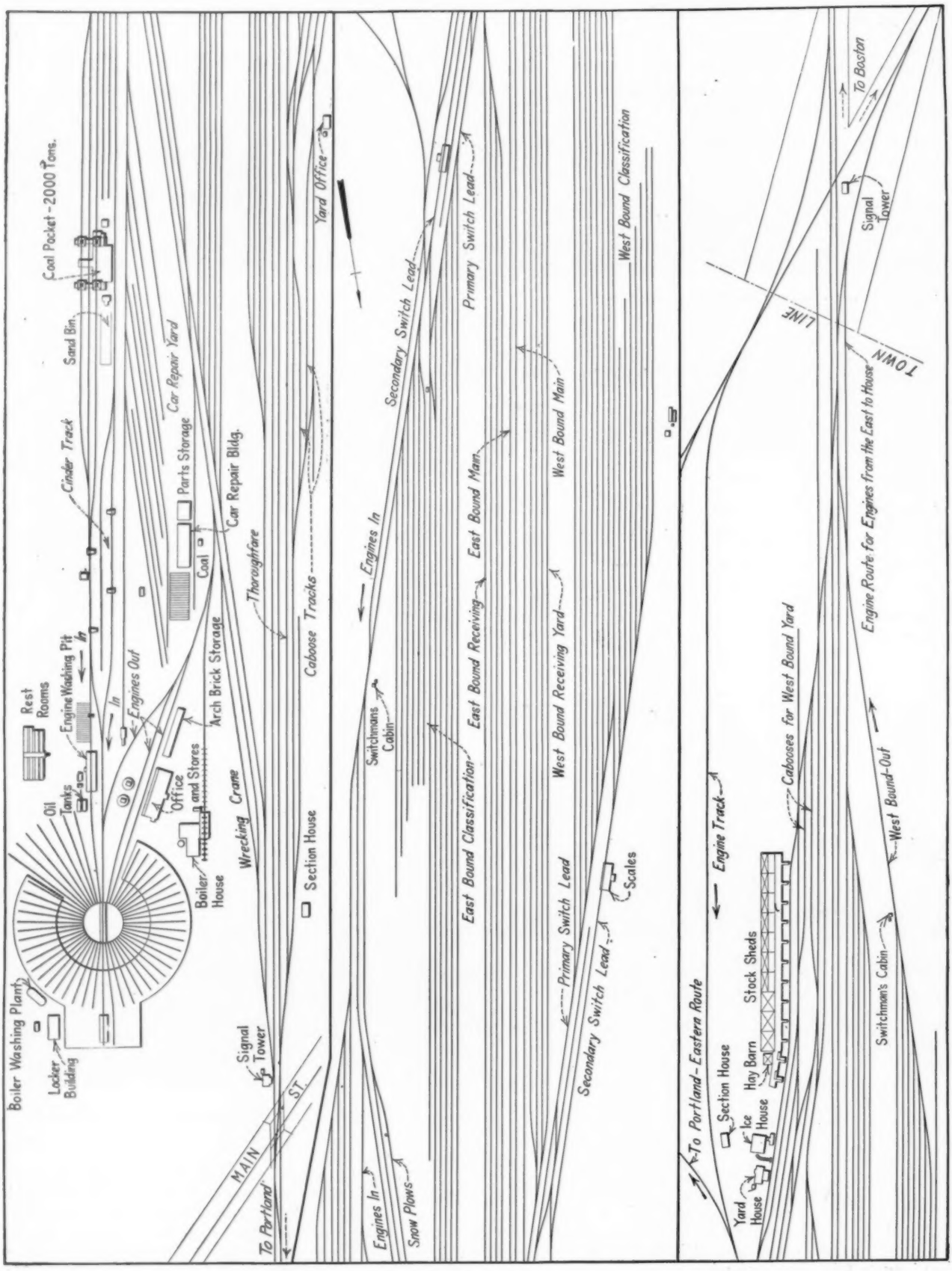


Coaling Station—Drag Line Ground Storage at the Left and Sand Drying House at the Right

Freight traffic at the Portland terminal was formerly handled in a system of 10 small yards, and there were at one time four separate enginehouses for conditioning and turning power. Congestion in these small yards became serious as the traffic grew. For years the yard at Deering Junction, four miles east of the city, was used as an auxiliary and a few tracks were also available at Rigby for eastbound freights. On the whole, however, the situation continued to grow worse, congestion and lack of centralization rendering efficient operation of the yards impossible.

The layout and equipment of the various enginehouses were also entirely inadequate, the designs having been made when locomotives were light, train dispatchments relatively infrequent and, in general, far less need existed for the rapid turning of power. For example, at one engine-house locomotives had to be sent across the turntable and up a spur track to take coal, the operation of coaling sometimes consuming as much as 1½ hours, besides causing two extra movements over the turntable. Coal and ashes were handled at

Ashes Are Handled by Four Chillingworth Pneumatic Ash Hoists



General Layout of the Rigby Freight Terminal, Portland, Me.

high labor cost and the track arrangement was such that frequent interference between idle locomotives, switchers and train movements caused serious delay.

Rapid Classification Saves Ten Switching Crews

The new yards will hold about 1,800 cars. It is possible to break up a freight train of 65 cars and sort it according to classification in 20 min. It is said that in two hours from

Lumber Bunter Which Saves Labor in Replacing Shifted Lumber on Flat Cars

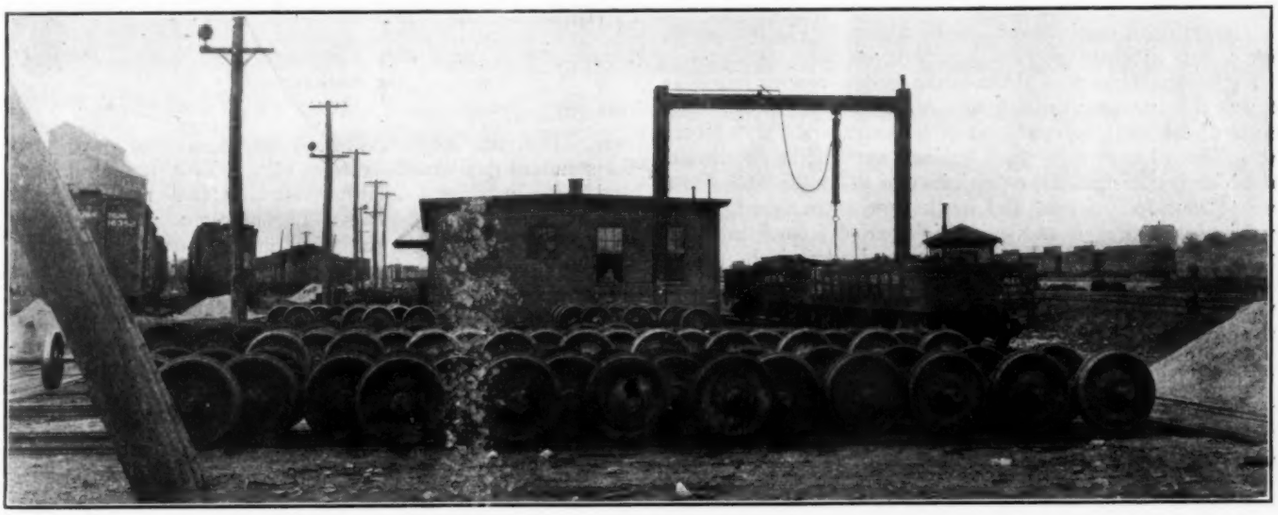
the time a car comes into the terminal it can be ready to leave on its journey east or west. With the old facilities it was impossible, most of the time, to make a creditable showing in train, car or engine detention, and while an 85 per cent on time record of outbound trains was sometimes obtained for short periods, this figure was usually from 50 to 70 per cent, and when delays did occur they were serious. The trains were so closely spaced and the track facilities such operation and track arrangement are such that delays to power of both outgoing and incoming trains are reduced to a minimum.

The normal number of cars handled in and out of the terminal is about 2,500. During periods of heavy business this number often exceeds 3,000 and has been as high as 3,450 daily. The improved conditions save ten switching crews a day and effect a marked reduction in the number of switching engines required during a 24-hour period in the entire terminal, including Rigby, Portland, Union Station, Deering Junction and Cumberland Mills.

Trestle and Fill Over the Fore River

Besides providing new yards and an engine terminal, a trestle and fill 1,600 ft. long has been constructed over the Fore river, enabling freight trains from the Mountain division of the Maine Central to move into the new yards instead of going into the already congested Commercial street yard. Likewise freight trains for that division can now be made up in the Rigby yards and hauled out over the trestle, proceeding up state without going into Portland proper. This is in line with the general program of giving freight as nearly as possible a straight line movement through the terminal and avoiding the necessity of through freight going to the small yards.

Most of the time the business requires two locomotives for handling westward cars and two for eastward cars. There are two classification ladders in each yard and switching is performed at the rear of the inbound trains. An independent lead from the main track to the receiving yard practically eliminates delay to the switching crews on account of freight trains pulling in or out. Upon the arrival of trains the major lead locomotive switches them, classifying all through business and all cars for local points. Cars for delivery in Portland, the shops and the repair tracks, hold cars, etc., are switched to a transfer track, and cars to be weighed, to an independent track between the two leads. The second lead engine pulls the transfer track and also the track where the



Wheel Storage at the Repair Track

that when one train had a bad start, others were usually seriously delayed as well. With the new facilities, on time reports for weekly periods have reached 95 per cent and are at present averaging 87 per cent. Formerly, particularly during the fall, winter and spring months, trains held out were numerous at times. With the present facilities this condition is practically eliminated as, in the case of particularly heavy runs and the resultant bunching of trains, there is still ample room at Portland to handle the overflow. Conditions of weigh cars are assembled. It classifies all locals, switches the cars to be weighed, caboose cars, and cars for the repair tracks and does other work. The same general scheme is carried out in both yards and each has its separate organization. A third trick locomotive is worked at night to serve the repair tracks and assist in handling early morning, close-connection trains. During heavy traffic a first and second crew are worked to serve the repair tracks.

While the construction of the new terminal at Rigby has

been under consideration for a number of years, the completion of the plans and actual undertaking of the work were precipitated by the burning of the enginehouse No. 3 early in 1923. Two outstanding features of the work were its magnitude and the speed with which it was initiated and brought to a conclusion. All grading, foundation work and track work was done under contract by T. Stuart & Son Company, Newton, Mass. Approximately 300,000 cu. yds. of earth were moved in filling a 70 acre tract, the surface of which was only about six inches above water level, 7,200 cu. yds. of concrete were placed in foundations for the various buildings and structures and about 28 miles of track, including 135 turnouts, were laid in the east and west bound receiving and classification yards and in the open and enginehouse tracks.

The contract for the structures was divided between the J. J. Prindiville Company, Framingham, Mass., the Gulliver Company and F. A. Rumery, Portland, Me. The list of buildings constructed and equipment installed follows:

Brick enginehouse, 40 stalls, with back shop 170 ft. by 100 ft.
Brick boilerhouse, 100 ft. by 40 ft., with 125 ft. stack and coal trestle.
Brick office building for general yard and motive power offices and stores, 110 ft. by 30 ft.
2,000-ton Fairbanks-Morse coaling station with re-claimable storage of 22,000 tons.
Sand plant with Roberts & Schaefer dryers and storage.
Four Chillingworth pneumatic ash hoists.
Two 75,000-gal. Chicago Bridge & Iron Works steel water tanks with water system and hydrants in yard.
Engine washing plant.
National boiler washing system.
95-ft. turntable with car hauler (American Bridge Company).
200-ton Whiting hoist.
Bowser standard hand and barrel oil pump equipment.
Wooden car repair shop, 100 ft. by 30 ft., with storehouse 40 ft. by 30 ft.
Wooden arch brick shed, 120 ft. by 15 ft.
Ice house and icing platform.
Stock yard, with capacity of 10 cars.
East and west yard offices.
Two 150-ton Fairbanks track scales with Fairbairn tapered decks.
Re-construction of Rigby West Tower and new towers at Rigby.
East, Fore river and Danforth street.
Locker building.
Rest-room for trainmen.

Preliminary operations were started in April but the work on the yards and the structures was not in full swing until May 1, 1923. In seven months, or by December 1, it was 99 per cent complete.

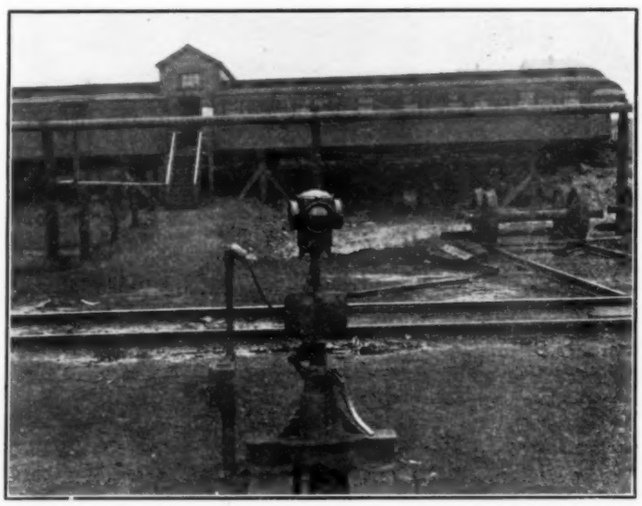
Rigby was chosen as the location of the new terminal as it was the nearest available site of the required size. Because of the swampy condition of this area and the presence of quicksand numerous wash borings were made, the results of which demonstrated the feasibility of using the site. From one to four feet of peat and muck were encountered, below which was a stratum of sand which varied from 4 to 25 ft. in depth. This sand was in most cases underlaid by quicksand. In general, spread foundations were designed based on a loading of one ton per square foot. Piling was not used except under the turntable, Whiting hoist, jacking piers and track scales. No quicksand was encountered on the site of the boilerhouse or office and stores building. The thoroughness of the work of building the foundations and constructing the buildings is attested by the fact that after a lapse of eight months no cracks have developed in any of the buildings.

The contractors utilized labor-saving machinery to the fullest possible extent in the grading, foundation and track work. One large steam shovel, one caterpillar shovel, three locomotive cranes and five locomotives with 50 gravel dump cars were employed. A track-throwing machine also proved a great time and labor saver on this job. Twenty-eight miles of track with 85-lb. rail were laid in the yards including the open and enginehouse tracks. One hundred and thirty-five No. 8 and No. 10 turnouts were installed using manganese steel frogs. In providing drainage it was found necessary to divert the course of a brook for several thousand feet and raise the grade of the yards slightly. The grade in the eastbound classification yard is such as to assist materially in switching. Cars shunted to a ladder track in this yard will drift down to the other cars but not at a speed requiring an individual rider for each car.

The yards are equipped with air pipes for charging trains, thus enabling trains to get away from the terminal quickly because locomotives can be coupled to trains which are already charged and in which the air brake defects have been corrected. Stock yards are provided of sufficient size to permit 10 cars of stock to be unloaded for exercise and feeding. Ice and salt for use in refrigerator cars are supplied from a small icing plant in the south end of the yard.

Twenty-four-Hour Operation of Repair Tracks

Many car delays at the Rigby terminal are also prevented by a 24-hour operation of the car repair tracks which are located just south of the enginehouse. There are six tracks in the car repair yard, each of which will accommodate 12



Electrically Lighted Switch Stand—Crew's Rest Quarters in the Background

cars. The four inside tracks are spaced so as to leave room for standard gage tracks between them. This permits lumber and heavy material, loaded on push cars, to be readily moved to any point along the cars. The movement of car wheels is also expedited along these intermediate tracks. The two outside tracks are intended to be used only for such repairs as do not involve the movement of car wheels or heavy material. The facilities for changing wheels and loading and unloading cars are shown in one of the illustrations, with the car repair shop and storehouse for tools and supplies in the background. Approximately a carload of wheels are changed at Rigby each day.

The number of men employed in the car repair yard fluctuates widely with the variation in the amount of work to be handled. The force originally created for the operation was approximately 75 men. Although a larger number could be used efficiently if conditions made it necessary, the only limiting condition being the provision of adequate switching when a large output is needed. The capacity of these repair tracks has not been tested to date.

Located on one of the tracks near the repair yards is the lumber bunter, which is illustrated. This device has demonstrated its value to such an extent that a similar one has been requested for installation at another point in the yard. Lumber, loaded on flat cars and displaced in transit, can be

quickly pushed back in place on a car without unloading and reloading. Approximately 20 tons of ballast is filled in at the rear of the bunter to give it a solid backing and enable it to resist the impact of the car.

Excellent Lighting Facilities Provided

In accordance with recent practice in the construction ot freight classification yards special attention has been given to lighting facilities at Rigby and a highly efficient system of illumination by means of flood lights installed. In addition to the 72 flood lights which will be referred to later in connection with the enginehouse, 27 Crouse-Hinds 500-watt lights have been installed for general yard lighting. Eight 250-watt lights of the same make are used in the car repair yards to facilitate night work on the cars. The lighting in the yards and the repair tracks is such that trainmen can readily read car numbers and car men make repairs on the darkest night.

Electric switch lights are provided for each of the 135 switch stands, these lights being made by Peter Gray, Boston. The switch lights are all on one circuit, the distribution being by underground Parkway cable installed by the railroad company. Owing to the small amount of current taken by these lights the power cost of operation is slight and there is also a saving of the labor of two men who would otherwise be required to clean oil lights.

For fire protection 10 hydrants are installed at suitable points, supplied by an 8-in. main connected with the city water system from Sebago Lake.

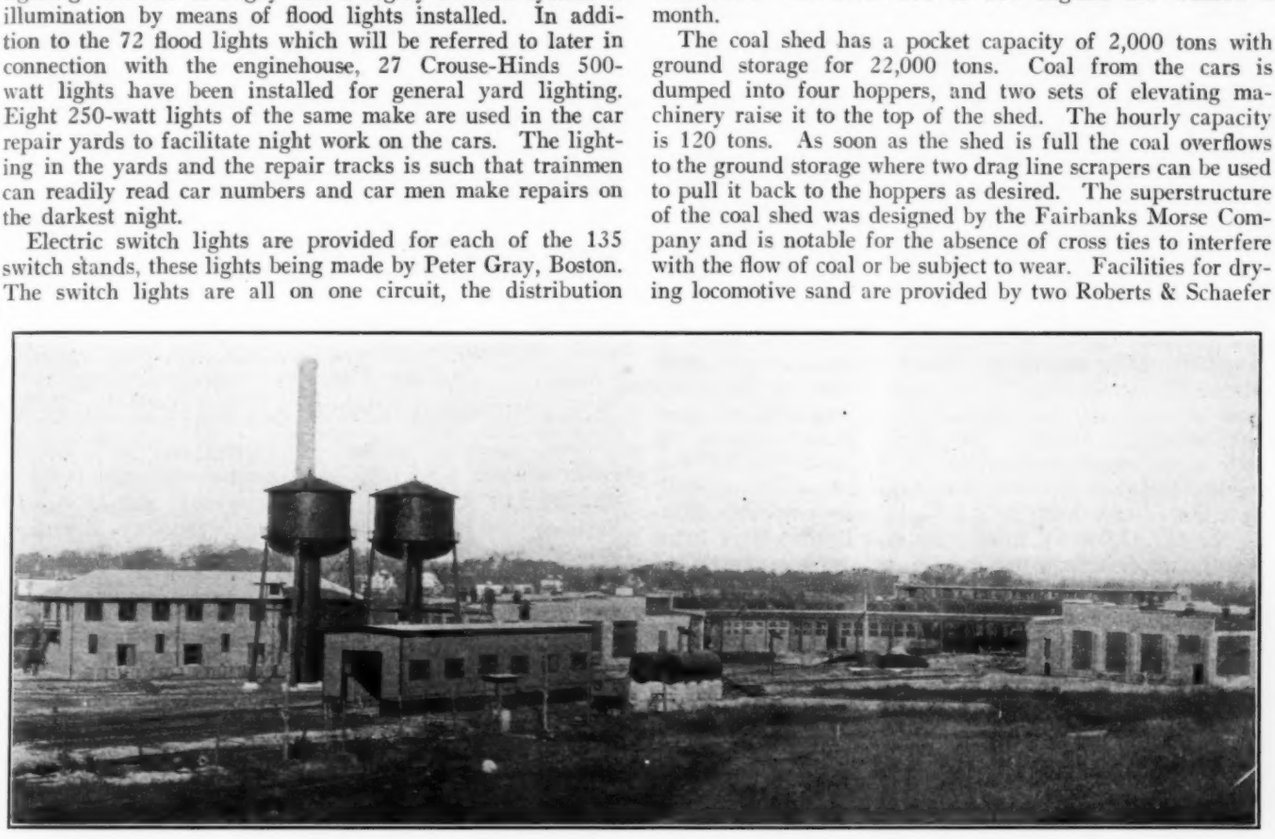
Modern Engine Terminal Layout

Straight line movement is provided for all locomotives from the receiving tracks south of the terminal to the coal shed, sand house, ash pit and locomotive washing shed and into the enginehouse. The track layout is such as to cause minimum interference with train movement. Wherever possible, duplicate facilities are provided at the terminal so as to assure reliability of operation.

The enginehouse, built of brick, will accommodate 40 locomotives. It is equipped with a 200-ton Whiting hoist and a repair shop with the machine tools required for normal running repair work. Special attention has been given to the provision of a modern tool room and checking system for the orderly maintenance and control of small tools. An Elwell-Parker crane truck assists in handling heavy locomotive parts about the enginehouse.

One of the important advantages of handling running repair work at the Rigby enginehouse, aside from the saving of locomotive time, is the fact that it will not have to be done at the repair shops at Thompson's Point as was formerly the case. The elimination of this running repair work has already enabled these shops to turn out from three to four more heavy repair engines a month. Ten stalls of the enginehouse are equipped with National boiler washing system connections and from 100 to 150 engines are washed a month.

The coal shed has a pocket capacity of 2,000 tons with ground storage for 22,000 tons. Coal from the cars is dumped into four hoppers, and two sets of elevating machinery raise it to the top of the shed. The hourly capacity is 120 tons. As soon as the shed is full the coal overflows to the ground storage where two drag line scrapers can be used to pull it back to the hoppers as desired. The superstructure of the coal shed was designed by the Fairbanks Morse Company and is notable for the absence of cross ties to interfere with the flow of coal or be subject to wear. Facilities for drying locomotive sand are provided by two Roberts & Schaefer sand dryers fed from an elevated bin into which sand is elevated by a bucket elevator from a 1,000 cu. yd. storage bin. After drying, the sand is blown by air pressure into a bin located in one end of the coal shed from which it is supplied to locomotives when taking coal.



Office and Stores Building with Power House in the Rear, Engine Washing Shed and Enginehouse at Rigby

Pneumatic Ash Hoists Installed

Between the coal pocket and the enginehouse there are four Chillingworth pneumatic ash hoists for handling ashes. Ashes are dumped from the locomotives into hoppers which guide them to the buckets underneath. These buckets are then pulled up the ways by the operation of air cylinders and by means of a suitable tripping arrangement are dumped into the cars on the adjoining track. Care must be used to cool the ashes with a stream of water from a hose but, in general in this latitude difficulty from this source has been found to be less than that occasioned by water ash pits. The labor cost of operating these ash pits is relatively small.

From the ash pit, locomotives are sent to the washing shed which greatly facilitates the keeping of locomotives clean, particularly in the winter months. A spray of hot water and oil is used to clean most of the grease and dirt from the locomotives and this operation, supplemented by a little wiping, keeps the power clean and in good condition. Moreover, by cleaning the locomotives a little each time they pass through

the enginehouse they never get in a condition where much time is required for the operation.

Water for the locomotives is drawn from two 75,000-gal. steel tanks raised about 60 ft. on steel towers; these tanks were erected by the Chicago Bridge & Iron Works. Golden-Anderson altitude valves are used to maintain the water level and prevent overflowing. There is also a provision whereby a valve in the supply pipe line closes automatically in case of accident to the water mains and prevents loss of water.

Bowser equipment installed for handling valve oil, kerosene, car oil, etc., consists of ten hand pumps and three barrel pumps. This equipment is in the same building as the general yard and motive power offices.

Enginehouse Lighting Facilities

The lighting system in the roundhouse is designed to facilitate the proper inspection and repair of locomotives at night. There are a total of 72 flood lights in the enginehouse and engine washing house in addition to 4 at the ash pit, 2 at the boiler-house and 4 at the coal hoist track and coal pile. These latter lights are 250-watt with diffusing lenses. Four Crouse-Hinds 250-watt flood lights are mounted on the coping of the enginehouse facing the turntable and spaced at even distances, a similar light being mounted over the main door of the repair shop. In the stall section of the roundhouse sixty-six 100-watt flood lights are provided, equipped with adjustable brackets. All lights located against the walls in the repair shop section are equipped with 200-watt Ivanhoe angle reflectors and those lights not against the walls are equipped with 200-watt R.L.M. Wheeler reflectors. During the day 17,000 sq. ft. of glass area in the engine house affords natural illumination.

Rest-rooms for the crews consist of seven discarded baggage cars and one coach. One coach is used as a lounging room and one as a wash and janitor's room, two for locker rooms and four as sleepers. Steam heat is provided during the winter and every effort is made to keep these quarters clean and comfortable. When the demand for rest accommodations at the enginehouse is determined more permanent quarters will be provided.

Operations at the Engine Terminal

Both freight and passenger power is handled at Rigby. About 324 men are employed on three shifts, 100 engines being turned every 24 hours. From a mechanical point of view the main advantages of the terminal consist of a concentration of facilities for turning and conditioning locomotives at one point where better inspection, supervision and facilities for repair can be maintained. Each engine crew makes a report on arrival which is telephoned immediately to the master mechanic. Locomotives are inspected on arrival at the enginehouse, there being no outside inspection pit. As far as possible wash-out and monthly boiler inspection dates are anticipated and the work evened out during the month so as to avoid congestion, delay and hurried inspection when a large number of locomotives must be handled in a few days at the end of the month.

Very satisfactory results have been secured in kindling fires with fuel oil rather than scrap wood. The method followed is simply to cover the grates with about three or four inches of coal with a slight mound at the center on which an oil-burning torch is directed until the mound becomes ignited. The fire then spreads rapidly to the rest of the coal. Pennsylvania high volatile coal is used and there is no difficulty in igniting the coal over the entire grate area. No figures are available in regard to the cost of firing locomotives with fuel oil as compared with scrap wood. The cost in the case of the wood would be entirely for labor whereas with fuel oil there is a combination of labor and material costs. The experience at Rigby, however, plainly indicates a net saving in favor of the oil method of kindling fires.

Freight Car Loading

WASHINGTON, D. C.

REVENUE FREIGHT CAR LOADING in the week ended November 1 amounted to 1,073,430 cars, a decrease of nearly 37,000 as compared with the record figures of the week before but 37,581 cars more than were loaded during the corresponding week of last year and an increase of 93,579 cars as compared with 1922. All classes of commodities except merchandise fell off as compared with the previous week but grain and grain products, coal, merchandise and miscellaneous showed increases as compared with 1923.

The Northwestern and Central Western districts showed reductions as compared with last year but the figure for the Western districts combined was brought up above that of last year by the increase in the Southwestern district. The loading of coal, coke and ore, however, was below the figures for the corresponding week of 1922. The summary as compiled by the Car Service Division of the American Railway Association follows:

REVENUE FREIGHT CAR LOADING

Week Ended Saturday, November 1, 1924

Districts	1924	1923	1922
Eastern	249,109	243,515	242,444
Allegheny	209,060	205,609	212,188
Pocahontas	51,957	42,725	32,087
Southern	158,014	147,835	136,624
Northwestern	153,053	155,390	142,350
Central Western	168,882	169,564	153,317
Southwestern	83,355	71,211	60,841
Total Western	405,290	396,165	356,508
Commodities			
Grain and Grain Products	62,350	47,815	51,603
Livestock	39,472	43,369	39,391
Coal	181,718	179,538	191,083
Coke	9,842	11,347	11,419
Forest Products	70,125	75,529	59,622
Ore	35,717	43,198	47,152
Mdse., l. c. l.	257,937	252,318	232,049
Miscellaneous	416,269	382,735	347,532
Total	1,073,430	1,035,849	979,851
October 25	1,112,345	1,073,841	999,718
October 18	1,102,336	1,073,095	989,889
October 11	1,088,462	1,085,938	969,487
October 4	1,077,006	1,079,776	953,952
Cumulative total, January 1 to date	41,156,593	42,651,738	36,199,995

With the decrease in loading the freight car surplus showed a slight increase in the week of October 23-31 to a total of 99,190 cars, including 30,486 box cars and 49,058 coal cars. The Canadian roads had a surplus of 2,100 cars, including 200 box cars.

Car Loadings in Canada

Revenue car loadings at stations in Canada for the week ended November 1 showed an increase of 659 cars over the previous week and 4,415 cars over the same week last year. The principal gains over the preceding week were in live stock and coal. Compared with the corresponding week last year the gains were in grain loading, live stock, lumber, merchandise and miscellaneous freight. The cumulative total to date this year is 2,438,687 cars as compared with 2,365,471 cars last year in the same period.

TOTAL FOR CANADA

Commodity—	For the week ended Nov. 1, 1924	Oct. 25, 1924	Nov. 3, 1923
Grain and grain products	20,011	20,410	18,875
Live stock	3,493	3,013	2,933
Coal	7,676	7,061	7,967
Coke	287	240	272
Lumber	3,842	3,493	3,580
Pulp wood	1,248	1,334	1,636
Pulp and paper	2,105	1,944	2,307
Other forest products	2,559	2,670	2,284
Ore	1,172	1,214	1,155
Merchandise, l. c. l.	16,017	15,910	14,931
Miscellaneous	16,054	16,516	14,109
Total cars loaded	74,464	73,805	70,049
Total cars received from connections	33,596	32,734	33,311
Cumulative totals to date, 1924	.....	.....	2,438,687
Cumulative totals to date, 1923	.....	.....	2,365,471

Two Years of Complete Transportation Service*

How Improvements in Plant and Operating Methods and Co-operation of Shippers Have Solved Difficult Problems

By Donald D. Conn

Manager, Public Relations Section, Car Service Division, American Railway Association

AT YOUR MEETING in Detroit in 1922 I told you of the plans of the railroads to rehabilitate and expand their machine, of the proposed forms of public co-operation, of our hopes of the establishment of adequate service on such a definite and permanent plane that car shortages, delays, congestions, and all of the ills of commerce resulting therefrom might be put behind us for all time. At Miami (December, 1923), we gave you a report of progress, and your splendid resolution of endorsement, coincident with the expressions of our federal body, gave encouragement to the incentive necessary for achievement. Today, I am proud to speak of accomplishment—actual and tangible results from the efforts and plans initiated two years ago.

1923 and 1924 Compared

We are completing two annual periods presenting diametrically opposite problems from a car supply and service viewpoint. Last year (1923) we entered the spring season with relatively small inventories, and buyers readily entered the market for large purchases of all kinds of goods early in the year. Manufacturing plants produced nearly to capacity at the outset and the tonnage of freight offered to carriers was nearly as great during the spring and summer as in the fall period. The peak loading for any one week of May, 1923, was 1,015,532 cars, while the fall peak in September was 1,097,493 cars, or an increase of only 8.1 per cent. Tonnage offered the carriers was more evenly distributed throughout each month of 1923 than for any previous calendar period, resulting in a more efficient and constant use of transportation facilities.

On the contrary, we entered 1924 with relatively large inventories at points of consumption; buyers promptly equalized their stocks with actual current demand. Production in industry fell off and the usual spring decline in car loadings, with corresponding increase in surplus plant, appeared. This condition of temporary easiness (not deflation, as the term is usually applied) was the result of the natural play of economic forces, and represented a healthy acknowledgment of our lesson in over production and excessive inventory which precipitated the drop in prices during 1920 with resultant decline in all production. Coincident with the increase in general business, 1924 has brought forth one of the largest grain crops ever produced, and the carriers have been called upon to handle the largest peak load in their history. Contrasted with 1923, the loading for the peak week in May, 1924, was 918,213 cars; for the peak week of October, 1924, 1,102,336 cars. This figure is the highest in history.† It was accomplished without car shortage, without congestion, without complaint and with an increase in serviceable locomotives and cars in storage compared with a year ago.

Hence, the plan of the carriers for continued adequate service has been tested during the past two years under distinctly different conditions and yet all obligations for public service have been met.

*From an address delivered at the annual meeting of the National Association of Railway and Public Utilities Commissioners, at Phoenix, Ariz., on November 11, 1924.

†It was, however, surpassed in the next week—that ended October 25th—when loadings were 1,112,345 cars.—EDITOR.

Not Alone a Railroad Responsibility

There are three reasons for this accomplishment:

(a) A vast improvement in physical facilities of the carriers together with large additions to their plant made at tremendous cost.

(b) Universal and complete co-operation between the carriers themselves and with the Car Service Division of the American Railway Association in car distribution.

(c) Co-operation of the public through the Regional Shippers' Advisory Boards.

Every element of trade and commerce has contributed, and must continue to contribute its share toward the continuance of this record of public service. It is continually more and more essential that a definite measure of business conditions and production shall be set down periodically in order that we may picture our task in advance of actual demand. Transportation regulations, such as Car Service Rules, can be practically applied only if they fit public need and receive the support of shippers in their enforcement.

	Peak week 1924, Oct. 18	Peak week 1923, Sept. 29	Peak week 1920, Oct. 16
Cars loaded	1,102,336	1,097,493	1,018,539
Serviceable locomotives in storage	5,424	2,620	514
Serviceable surplus cars	99,952	41,745	2,188
Reported car shortage	1,151	15,331	69,517

NOTE—On October 15th, 1924, the American Railways moved 1,030,211 loaded and empty cars. The largest number of cars moved on any one day in history.

Necessity for Correlating Force

Furthermore, the carrier serves everyone, all agriculture and industry; hence there must be some correlating force on the part of all interests as to the obligations of the railroads. In the complexities of our economic life today, where all territories and all shippers are inter-dependent upon each other, no single railroad is self-sufficient and no problem of transportation concerns only a few, but rather affects directly or indirectly the shippers of every phase of production. The time is past when any one industry can dis-associate itself from the prosperity and welfare of others—all expect like consideration from the common utility and all must harmonize public demand concerning what the railroad obligation is and how it should be met. Its solution is equally dependent upon all factors of production and distribution, and upon the adequacy of industrial facilities—all of which are controlled by industry and agriculture itself; it is a task for common unity and purpose of all forces of trade and commerce. The Regional Advisory Boards afford the channel for carrying forward these purposes.

Carrier and Advisory Board Results

In spite of the fact that much refinement is still necessary in the Regional Board organizations, and while the oldest has only been in operation two years, their practical accomplishments thus far justify them as having made the greatest single contribution to the welfare of the country since the war. It will be interesting to review briefly some of the practical results emanating from this channel of co-operation between the carriers and the public:

(a) Vast improvement in the carrying out of necessary rules governing car supply and distribution.

(b) Because of daily automatic observance of Car Service Rules more empty cars of western line ownership have been moved westbound through the St. Louis and Chicago gateways than was accomplished in 1923 under mandatory orders of the Car Service Division.

(c) Practical advisory control by the Northwest Regional Advisory Board over the movement to terminal markets of the largest grain crop in the history of that section of the country, and without car shortage.

The necessary embargoes governing the movement of grain to terminal markets have been recommended by the Special Terminal Committee of this Board.

(d) Co-operation between the Trans-Missouri-Kansas Regional Advisory Board and the carriers resulting in the complete movement of the Kansas and Oklahoma grain crops without car shortage while daily receipts of the Kansas City market exceeded all previous records in history.

(e) Establishment of terminal committees composed of receivers of perishable products at large unloading centers resulting in more prompt disposition of perishable products and quicker unloading of refrigerator cars for return to origin territories.

(f) Revision of the method of marketing juice grapes in the New York Terminal whereby all receivers agreed to take deliveries on the Jersey side, thereby eliminating that delay to refrigerator cars which has constantly occurred when deliveries were allowed on Manhattan Island. This accomplishment has unquestionably resulted in quicker disposition of the product, with higher prices to the producer and more expeditious movement of the equipment.

(g) Institution of nation-wide campaigns in every territory for the heavier loading of equipment and for the cleaning of cars by receivers of freight.

(h) Adoption of uniform rules for the distribution of grain cars in the states of Montana, North Dakota, South Dakota and Minnesota between Farmers' Co-operative, Independent, and Line elevator companies.

(i) Adoption of uniform method for rating of saw mills in the Southeast and Southwest Board territories in order to effect an equitable distribution of closed car equipment between the different units of that industry.

(j) Establishment of quicker service in the handling of so-called "cotton compress tickets" in the Southwestern Board, thereby eliminating delay to equipment under load.

(k) Analysis of the production, sales, shipments, and other factors of the business conditions of each industry and each branch of agriculture by the commodity committees at each regular board meeting, thereby setting forth a definite measure of the future transportation needs of each operating district—giving the Car Service Division a picture of its responsibilities in effecting an even supply of equipment throughout the different territories.

These examples are cited only as illustrations. In addition thereto it has been possible through these channels of voluntary co-operation to settle every question and complaint concerning transportation service except one, which still remains on the docket of the board committees. Perhaps the greatest element of good which has come from this association is the establishment of those intimate human relationships between shippers and receivers of different commodities and the railroad officers so necessary for a proper understanding of the common problems in every district.

Fundamental Principles

Underlying the Regional Board organizations there are certain fundamental considerations. In the daily conduct of human relationships we are governed by two different sets of restrictions. The first, the positive law which we write into statutes and which is absolute. We cannot deviate from it, it is rigid in its application, it prescribes definite limitations.

The second, what I will term the law of co-operation, is enforceable only when people recognize their obligations to each other, the dependence of one business upon another, the realization that no one can meet with lasting success in one line of endeavor without contributing something, aside from that prescribed by statutory law, to the problems and advancement of others. Since the war this country has been undergoing a silent struggle to adapt itself to a new level of affairs—to find an economic plane from which to strike out to the future. You have all unquestionably been conscious of this growing development, out of which comes a great need for the establishment of a sympathetic bond of interest between all elements of our industrial life. We might characterize this growing need as emphasizing the necessity for greater enforcement of the law of co-operation. We cannot live and prosper unless we make this law of paramount consideration.

Hence, regulation of the railroads is a good thing, over-regulation equally as bad, and the hand of government should not be extended into the relationships between shippers and carriers on questions which it is perfectly possible for them to adjust between themselves. There is a place where the law of co-operation may fail in which case we fall back on the law which is absolute. But this process should be discouraged and only used in case of aggravated emergency. This is the basic principle of the Regional Boards—it is a common measure which can be applied to all industry and agriculture. It is an attempt to arrest the process, in a practical way, of the constant trend of government in business.

The Problem of Distribution and Statutory Law

The law requires a carrier to furnish transportation service and car supply on demand. If I were a shipper I would consider this provision as fundamental. It is a protection and a basis for the carrier obligation. But there is no statute which provides that the shipper and consignee shall themselves be equipped to meet adequately their responsibilities in disposing of the flow of traffic; there is no statute which requires the public to purchase coal when the price is low and cars are plentiful. Nor is there any liability on the part of any shipper or producer to adopt efficient marketing methods in the distribution of his product. He may do as he pleases. I may have my office "in my hat" and still demand certain definite service as provided by statute from the carrier. Therefore, we cannot divorce the economic elements inherent in every business from the volume and character of transportation supply.

If, in any grain producing belt, the country elevator capacity was but 50 per cent as large as required for the season's crop, then the transportation companies must furnish just that many more cars to care adequately for the movement of that production. If a farmer plants additional acreage without consideration of where he will eventually sell his products or in fact whether there is an actual demand for greater volume, then the railroad is still obligated to furnish equipment to move the product even though it may not bring freight charges.

The movement of the tremendous northwest grain crop has pyramided upon the markets of Duluth and Minneapolis faster than disposition could be made by terminal elevators which results in car delay and necessitates the keeping in service of that many more cars than otherwise would be necessary. Notwithstanding the fact that coal could be purchased below the cost of production during the spring and summer of this year, consumers awaited the fall rush and now all mines and all dealers are demanding a full complement of service in spite of the fact that for eight months of this year the railroads had upwards of 200,000 surplus

coal cars. This binding statutory law upon transportation encourages production but says nothing about distribution or marketing methods. With a general recognition of the interrelation between all three factors of commerce we find that there is but one way by which to harmonize these responsibilities and that by the application of the law of co-operation.

You cannot successfully legislate or compel any industry or farmer to match up his production and methods with the demands in a great continental market, but producers and shippers of all commodities can form a common meeting ground to study all these phases of business upon which transportation supply is so dependent and through public education constantly effect improvement towards a more even usage of the transportation machine and a better economic condition for themselves.

We must go forward and perfect these regional organizations, the railroads must be kept constantly ahead of the game in their effort to perpetuate and enlarge upon the results of the past two years and we must never return to the days of uncertainty when car shortages were a habit and periodical transportation disabilities constantly confronted us. This is a very possible objective to reach. There is plenty of room for initiative and private enterprise in the railroad business, especially when we remember that this rehabilitation of transportation has been brought about since the passage of the Transportation Act. The railroads have done an excellent job and they have no apologies to make to anyone. What they, the farmers and industries need henceforward more than anything else is a rigid enforcement of the law of co-operation.

Curtailing Correspondence in Railroad Offices

An Effective Effort to Reduce Unnecessary Letter Writing Is Bound to be Profitable

By C. U. Stapleton
Supervisor of Office Methods, Canadian National Railways

ONE OF THE ARGUMENTS used by manufacturers of dictating machines is that a large proportion of the stenographer's time, during periods of dictation, is idle time. A general survey of railway offices bears out this contention. It is exceptional to see a person read and analyze his day's correspondence before commencing dictation. There are a few who have made it a habit to determine just what they want to say, and how the different matters demanding attention should be handled, without keeping the stenographer waiting with her pencil poised during a scrutiny of the files.

Of course there is something to be said against reading the file, or at least the incoming letter twice, which is necessary when dictation is delayed, but this is offset by the additional thoroughness with which the subject is handled when dictation finally occurs, the better wording and construction of the letter, and the fact that the production of the stenographic force is not curtailed by lost motion.

One thing that needs correction badly is the habit of dictating letters that do not close the files, but merely pass incompleted transactions on to someone else. It is very noticeable in installing new filing systems that this is a common fault and it must cost the railways a lot of money.

Proficiency in handling correspondence should not be judged by the number of files handled but by the number of files closed by the dictator. Dictation could be reduced if the person dictating would make sure that the information required from junior offices is not already in his own files. Too many letters are redictated and passed along to the lowest office requesting the assembling of data already on record in the senior offices. The junior offices are, as a rule more poorly equipped to handle the extra work. It is of course easier to write another office than to look up weekly or monthly report files, or other sources of information, but this is only another instance of "passing the buck."

Joint Letters

The use of the joint letter where routine matters are being taken up and where the letter has to pass through from two to four intermediate offices before it reaches the source of the desired information, should be productive of economy in many ways. Apart from the time consumed by three or four dictators and the cost of re-transcribing and typing, there is the delay and time wasted, which would be overcome by making multiple copies of the original letter and sending a copy to each of the officers who would have handled the transaction in a "rubber stamp" manner under the other method. Of course, a great many of the letters written could not be answered by this direct method, because sometimes the answers must be amplified, or scrutinized, by the officer next in seniority before submission to the highest officer, but a percentage of the replies could be made in multiple and copies sent direct without the circuitous routing which is unavoidable with other than routine matters.

If there is objection to this plan, the requisite number of copies could be made at the first typing, and attached to the original to be forwarded by the office next in line after one copy is detached for the office record. Although this method would not save all the delay in reaching the office having charge of the particular activity which would furnish an answer to the letter, it would save all the heavy expense of re-dictating and re-transcribing. Also, if the answer was routed back in the same manner, it could be amplified by a postscript if any intermediate office so desired.

Two-Subject Letters

Some dictators still need to be reminded that subject filing does not permit a letter concerning two subjects to be filed in two places, unless copied by the receiving office. Where an index is used, a cross reference can be made, but many offices do not give files individual consecutive numbers under subjects, but only the subject numbers, and in these cases a detailed index is seldom used. In addition to this the correspondent may not be able to answer more than one subject and will either hold up the letter until information is available to answer in full, or will reply to the individual subjects in separate letters. In the first case the delay may result in a loss to the railway, and in the second case the file cannot be closed until the follow up letter is received. These "two-subject" letters are also very hard to handle in a future reference or tracing system.

Persons dictating are prone to overlook the importance of

subject headings on all their letters. Subject headings greatly facilitate the handling of correspondence, even in cases where the file number of the recipient of the letter is quoted, because they eliminate the necessity of reading the letter to determine the subject, by all those through whose hands the correspondence passes before its final disposition.

File Numbers

Greater recognition is now being given the practice of quoting both file numbers, and it is usually the custom to quote these numbers either on the upper left or right section of the letterhead. It has been found, with any volume of correspondence, that time may be saved by quoting your own file number immediately under the date, which is the first point referred to by the dictator in replying to your letter, and by quoting the file number of your correspondent in the first line of your letter, making this line a paragraph by itself, viz:

"Your letter No. 10, File 6285-23."

Even when there is a printed form on the original letterhead indicating the position in which file numbers should be quoted, it is said by file clerks that while the two numbers are easily distinguished on the original letter, the filing department only receives a carbon copy of that letter, and where offices are using the same subject number, but a different consecutive number, it becomes difficult to distinguish between the two quoted file numbers, when they are not separated on the carbon copy.

Many railway departments handle routine correspondence by personally dictating every reply, even when the inquiries received almost daily must be answered by furnishing identical information. In fact, some dictators will answer two letters one after the other from two entirely different sources, but requesting the same information, and attempt to make the letters individual, rather than instruct the stenographer to repeat or slightly alter to fit the other case. A paragraphing system designed to handle letters of daily dictation greatly speeds up the stenographic production and cuts down the time of dictation. It is not difficult to assemble a series of paragraphs which will answer routine questions when they are repetitive, and these paragraphs can be so combined that the letter will not resemble a circular letter.

After a stenographer has taken dictation from one man for any considerable length of time, she can very often construct the reply to a letter if she is given the gist of that reply, but it is noticed that while some men take full advantage of a stenographer's capability in this respect, others completely overlook this means of curtailing dictation.

Admitting, that in railway relations with the public, courtesy, or at least its outward observance, must obtain, there is room for doubt if, in inter-departmental communications, stenographic economy could not be carried out to the extent of eliminating words and phrases, which amount to nothing more than a demonstration of goodwill or politeness between the correspondents. Even "Dear Sir" and "Yours truly" would seem to be superfluous among fellow employees where the wish may be taken for the deed. More memos, and fewer letters, would serve to cut down the hundreds of thousands of unnecessary salutations between departments.

Letter Costs

The following quotation from our C. N. R. Magazine is pertinent to the subject of letter costs.

"If you were told that the average letter written cost ten cents, you would probably make a mental calculation on the cost of stationery and labor and estimate this amount to be about right. It is practically impossible to send out any letters, other than circular letters, at anything like this figure. Consideration of the elements which enter into the cost of a letter convinces one that a personally dictated letter must be handled without lost motion to keep the cost down to 30 cents.

An investigation into correspondence costs in the United States disclosed the fact that it was not uncommon for dictated letters to cost half-a-dollar each and, in some cases, as high as one dollar.

"Let us follow our own analyses of the items of expense in the process through which one letter passes, from dictation to final filing:

1. Time of dictator and stenographer during dictation.
2. Time of stenographer transcribing dictation.
3. Cost of stationery (typewriter ribbon, pencil, note book, carbon paper, carbon copy sheets, letterhead and envelopes).
4. Time of mail clerk despatching letter.
5. Time of file clerk filing office record.
6. Cost of carrying letter to destination.
7. Time of file clerk making attachment.
8. Time of correspondence clerk reading, etc.
9. Space occupied in filing cabinets in both offices.
10. Proportion of overhead on all these employees, that might be charged to time consumed in this transaction. (Space occupied, light, heat, taxes, insurance, depreciation and interest on money invested in office, appliances, furniture and filing equipment).

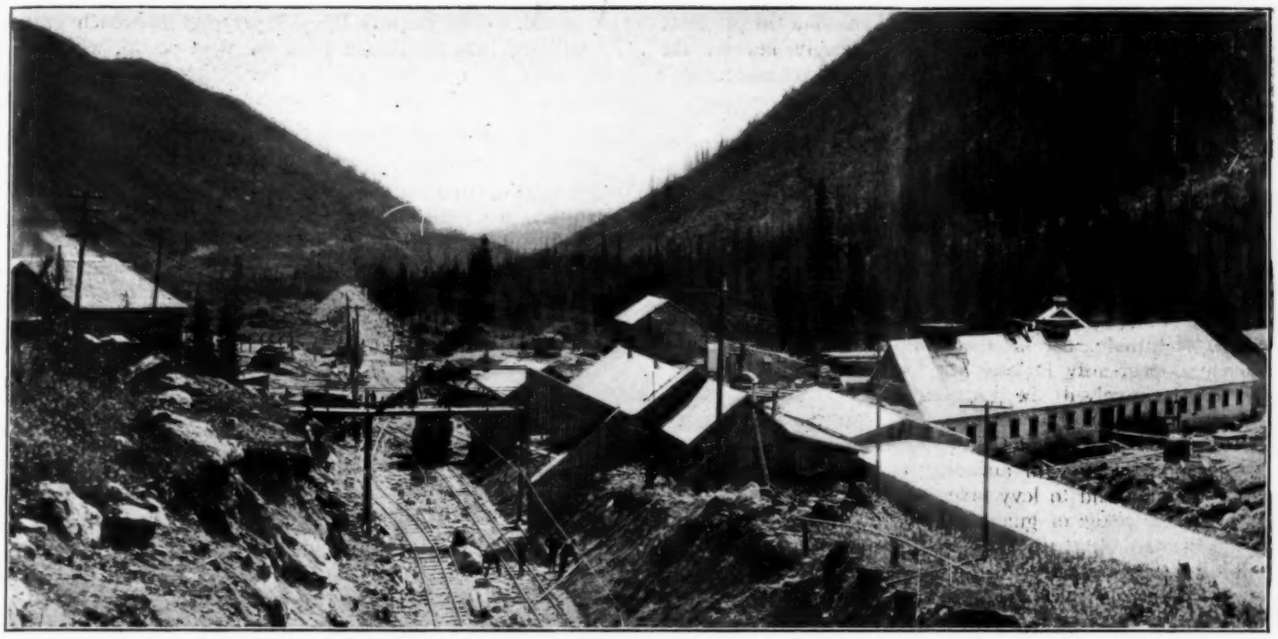
"The cost of the above items naturally varies with the locality of the operation, so that each office interested in estimating its average cost per letter must place its own valuation against each item. Where letter registers are used, the cost increases. The estimated average cost, including material for a completed page in a letter register is approximately 50 cents.

"Probably some letters are written where a telephone message would adequately replace both letter and reply. Perhaps some letters are written enclosing others where a notation or a printed form would answer."

Reduction of Tracing

If all letters requesting information were acknowledged by letter, when the information was not likely to be forthcoming within a few days, and the probable date of furnishing the information noted in the acknowledgment, many thousands of tracers would be saved. It is quite a common occurrence that two or three tracers follow a letter, and as many as seven or eight sometimes are sent out before a reply is received. An office averaging only five tracers a day is spending approximately $300 a year, the greater part of which might be saved if prompt acknowledgment of all letters, on which tracers might be anticipated, were made by all offices. Unnecessary and expensive correspondence has long been a burden to railways and any effective effort to reduce it is bound to be profitable. Co-operation in this connection is one of the vital necessities of today, because the continuous heavy increase in the volume of correspondence is now a very serious problem in all large organizations.

Model at University of Illinois of Track Used on Philadelphia, Germantown & Norristown R. R. in 1832



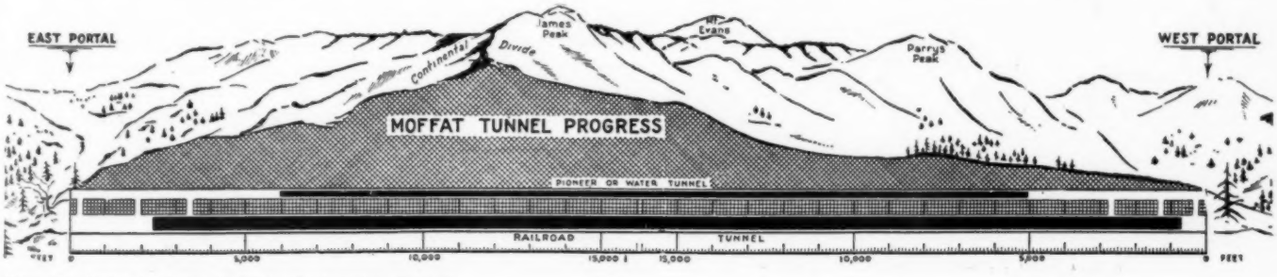
Looking from the East Portal of the Tunnel Over the Approach

Work on Moffat Tunnel Now in Full Progress

Headings for America's Longest Railroad Tunnel Have Been Driven One Third Through

THE COMPLETION of headings in the Moffat tunnel for nearly one-third of its total length of 6.1 miles during the first 12 months of actual construction affords reasonable assurance that this remarkable project will be completed within the estimated construction period. Thus the dream of the late David H. Moffat of an effective rail route from Denver into the interior of northwestern Colorado, with the vision of its eventual extension to Salt Lake City, as an important link in a transcontinental railroad, is assuming more nearly the aspect of reality than at any time since he first undertook the construction of what is now the Denver & Salt Lake railway.

That the tunnel through the continental divide was the key to the success of this road was thoroughly recognized by Moffat at the very outset, but he died in 1911 while striving in vain to raise the necessary funds to carry out this essential feature of his plan. As a result, the railroad has had to struggle ineffectively for 17 years to conduct a transportation business in the face of physical obstacles such as confront no other road in this country. The road was built to a ruling grade of 2 per cent except for the 30-mile "temporary" line over Rollins pass, which was constructed in lieu of the tunnel. This summit crossing not only embodies 4 per cent grades, an exceedingly tortuous alinement and a climb to elevation 11,660, or 2,420 ft. above the highest elevation attained in the tunnel crossing, but it also subjects the railroad to winter weather with extreme cold, heavy snowfall and frequent blizzards for almost eight months of the year. Therefore, added to the great cost of handling trains on a grade that requires four locomotives for 22 cars, there is the enormous expense incurred in fighting snow which with the other maintenance costs consumes about 40 per cent of the total outlay for the operation of the property. It is small wonder that the road has been beset with financial difficulties, and that the construction of the tunnel, which would have eliminated



From the Bulletin of the Colorado Engineering Council

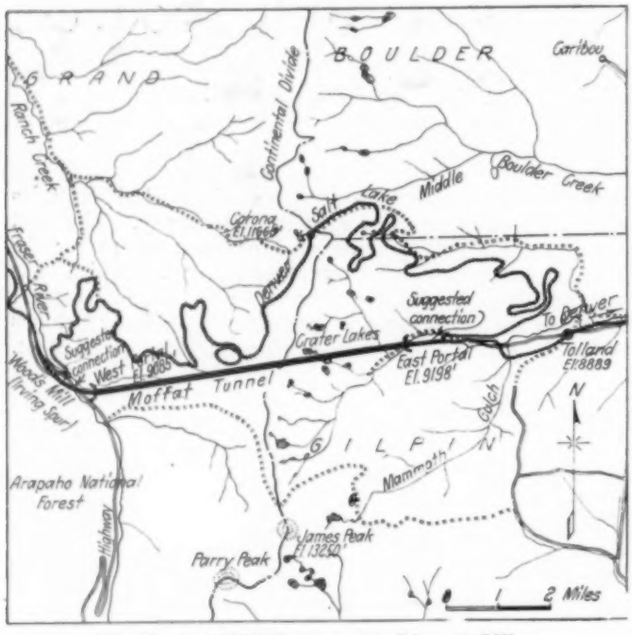
Cross Section of the Tunnel, Showing Progress to Date

many of the railroad's troubles and resulted in a great reduction in operating expenses, lay entirely beyond the ability of the railroad because its credit was exhausted.

Repeated Efforts Were Made to Finance Project

Actual construction has come about only after years of effort to develop some practical plan for raising the necessary capital. Private financing having proved impotent, attention was directed toward the application of public credit, first, that of the city of Denver and later that of the state of Colorado, but in each case the efforts were unsuccessful. Constitutional restrictions in the one case and lack of statewide interest in the other were the stumbling blocks. Ultimate success was attained through resort to a procedure frequently followed in financing public improvements. It involved the creation of a "tunnel district" embracing that portion of the state presumed to derive benefits from the completion of a tunnel, with a tunnel commission clothed with authority to issue bonds and construct a tunnel and to levy taxes on the property within the district as a means of guaranteeing the payment of interest on the bonds and set up a sinking fund for their retirement.

While unquestionably the greatest economic benefit of the tunnel will be derived from its use as a railroad tunnel, construction has been undertaken without any definite arrangement for such use. This must be brought about by lease as the result of negotiation. Under the law, however, the tunnel can not be leased for railroad use exclusively. Provision must be made also for the transportation of



The Tunnel Will Shorten the Line 24 Miles

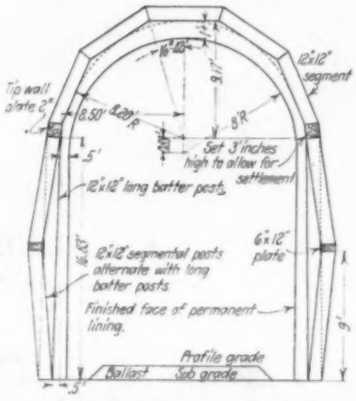
highway vehicles, electric current and water, the last named to be conducted through a separate bore designated as the water tunnel built alongside the railroad tunnel.

The tunnel will be 6.1 miles long, this being the shortest possible distance in which the crossing can be made at the point of closest proximity of the canyons of South Boulder creek and the Fraser river, on the east and west slopes respectively without exceeding the ruling grade of 2 per cent on the east approach. Connections to the existing line of the Denver & Salt Lake will require the construction of a one-mile approach on a 2 per cent grade at the east end and a two-mile approach on 2 per cent and 0.9 per cent grades on the west end. The base of tie at the west portal is at elevation 9,085 ft. or about 113 ft. lower than at the east portal. Consequently the 0.9 per cent approach grade is continued into the tunnel from the west portal, while the grade from the east portal is 0.3 per cent upward to insure adequate drainage during construction.

Tunnel Built for Single Track

The railroad tunnel will have a clear width of 16 ft. to a height of 16 ft. above subgrade, above which it will be finished with a semi-circular roof of 8-ft. radius, thus giving a clear height at the center of 24 ft. above sub-grade. The water tunnel is to be 8 ft. square or of other dimensions affording an equivalent cross sectional area. The distance center of center of the two bores is 75 ft.

The tunnel is being built by Hitchcock and Tinkler, Inc.,



Timbering Used with Sub-Bench Method of Excavation. Long Posts Not Set Until Second Lift Is Taken Out

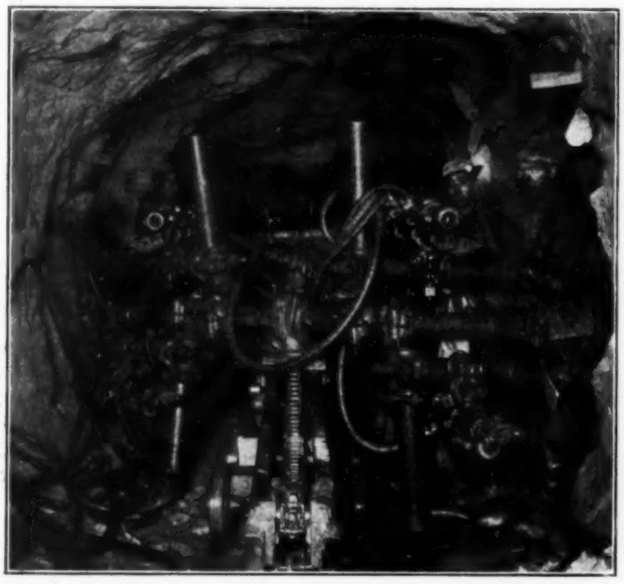
Denver, Colo., under a fixed fee form of contract, which provides for the division of any savings in the cost under an upset price of approximately $5,250,000, the exact amount depending on the actual quantities involved.

While the distance between the portals through the tunnel will be only six miles, communication between the portals is to be had only via the slow railway trip of 30 miles over the summit or a ride of 75 miles by the shortest highway route. For this reason it was necessary to create complete and entirely independent construction organizations for the conduct of the work at each end of the tunnel.

The distinctive feature of the tunneling method is the simultaneous driving of two parallel headings 75 ft. apart center to center, one being enlarged subsequently to form the railroad tunnel and the other to serve eventually as the water tunnel. Cross cuts at intervals of approximately 1,500 ft. afford the necessary means of communication between the two headings. The prime advantage of the twin heading method arises from the means it affords for the conduct of the heading operations, especially the removal of the muck, without any interference with the work of enlarging the railroad tunnel; consequently both operations can be conducted more rapidly and economically. The method has the further advantage that in difficult ground where the necessity for timbering results in slowing up the enlargement operation it is possible to conduct this work at a number of points simultaneously by removing the muck through the cross cuts and out by way of the water tunnel. Another advantage which has been developed in the east headings of the Moffat tunnel is the opportunity it affords for the economical driving of the headings themselves. By employing only one complete tunneling gang for each shift on the two headings, it has been possible to keep both the drillers and muckers busy at all times. The former drill the holes in one heading while the latter clean up the muck in the other, the two crews changing places to repeat operations as soon as they finish their work.

Conditions Differ Widely at Two Ends

The Moffat tunnel affords an excellent opportunity for a thorough test of the twin heading method because the conditions which have been encountered in driving the headings for 5,800 ft. from the east portal and for 4,000 ft. from the west portal are entirely different. At the east end the rock is solid and, except where veins of crushed rock have been encountered at fault planes, no trouble has been experienced with unsound rock and only a very small amount of timbering has been required. On the other hand, at the west end, the rock, while of much the same general character, biotite granite gneiss, has been so badly crushed



Drill Carriage Mounting Four Drills Ready to Be Set in Position in Main Heading

and distorted by geologic action that heavy timbering has been required for almost the entire distance that the headings have been driven thus far. As a result, the tunneling methods pursued at the two ends are entirely different, yet in each case it has been clearly demonstrated that the work is greatly expedited by the presence of a small independent heading alongside the main tunnel.

The only point of similarity in the operations is in the use of the water tunnel as the transportation route between the portals and the heading operations. A two-foot gage track in this tunnel with a switch track through the last cross cut to the other heading provides effective means for the removal of the muck in Koppel cars of 50 cu. ft. capacity. The driving of the headings is followed to the last cross-cut excavated with the erection of a trolley wire carrying 250 volts direct current for the operation of four-ton General Electric trolley locomotives, while beyond the end of the trolley wire the muck cars are hauled by four-ton storage battery locomotives of the same manufacture. At the west end of the tunnel where the enlargement is conducted in a piecemeal fashion, a large part of the muck from this operation is removed by this same equipment by way of the water tunnel.

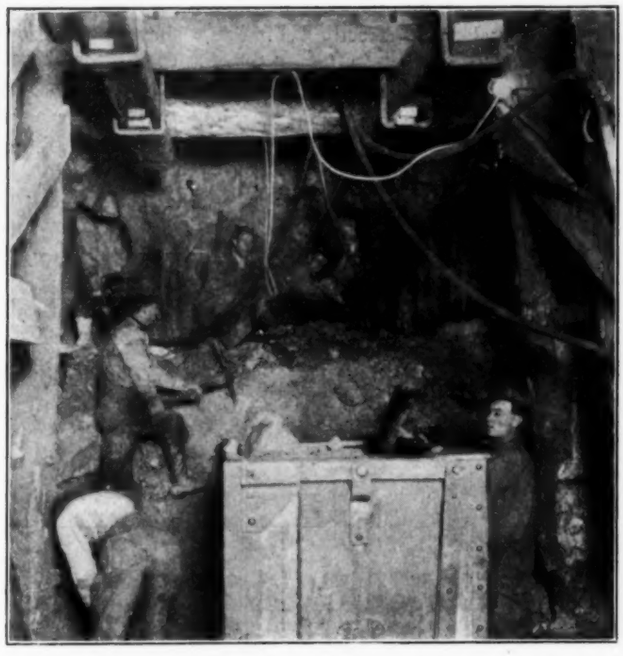
Owing to the difference in the methods followed at the two ends of the tunnel, it is necessary to consider them independently, and as those at the east end are much simpler, they will be described first.

How the East Headings Are Being Driven

The heading crew for each of three eight-hour shifts consists of 15 men—a shift boss, 4 drillers, 2 helpers and a nipper—who do the drilling and blasting in one heading, while the mucking force, embracing a mucking machine operator, 3 muckers, a motor man, a brakeman and a scaler, are removing the muck in the other heading. The drilling is done entirely from a carriage which consists of an approximately horizontal boom mounted on a truck by means of which it is quickly transferred from one heading to the other. On the boom is mounted a trolley which supports a cross bar 4½ in. in diameter, to which, in turn, four arms may be attached at any point in its length for the support of four Ingersoll-Rand drills of special design. At the rear of the carriage is a lubricator of two gallons capacity which feeds oil to the drills through the air hose.

Each advance of the heading requires the drilling of 26 holes 8½ ft. long, arranged as shown in the diagram. The drilling of each hole requires the use of four bits in the following order; 2½ in. diameter, 3 ft. long, 2⅛ in. diameter 5 ft. long, 2 in. diameter 7 ft. long, and 1⅞ in. diameter 9 ft. long. In general each bit is used only once before it is returned to the shop for resharpening.

The normal charge for a round is from 150 to 175 lb. of 60 per cent gelatin, although 40 per cent explosive is used occasionally in the softer rock. Effective results in the blasting of a heading, where the block of material to be removed is enclosed on all but one side, require that a wedge of rock to the full depth of the cut must be released



Excavating and Loading Loose Rock in the West Portal, Showing Timbering Close to Breast

from the center before the material at the top, bottom and sides can be moved. This requirement is met by drilling eight holes (cut holes) at an angle so as to enclose a wedge of rock in the center of the heading and loading these eight holes for direct firing, while delay exploders are used for the remaining holes so that the detonation of the charges will occur in a predetermined order. Owing to frequent changes in the nature of the rock, the charges, order of firing and arrangement of holes are subject to considerable variation.

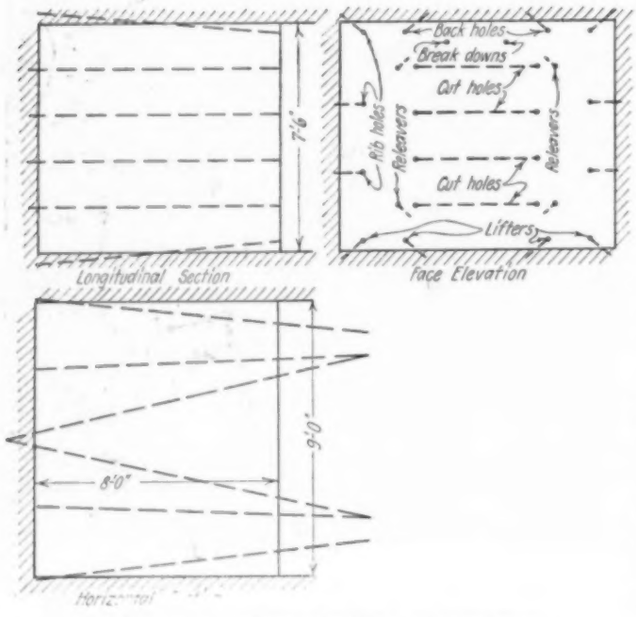
Power Equipment for Mucking

One of the most important items contributing to economy and rapid progress in driving the headings is the use of an ingenious mechanical mucker built by the Conveying-Weigh-

ing Company of St. Louis, Mo. This consists of a heavy motor-driven car equipped with an apron or scoop at its front end that is driven into the muck pile by propelling the car forward on the track. The apron is designed to swivel about a vertical axis so that it can reach both sides of the heading. The muck picked up on the apron is discharged onto a conveyor belt by swinging or folding it upward. The conveyor extends back over the top of the machine and discharges into a muck car placed at the rear. These machines have proven thoroughly effective and stand up well under the severe service to which they are subjected. Under favorable circumstances, each heading shift will complete two rounds or a total of six rounds for the three shifts in the 24 hours. This represents an approximate advance of 48 ft. for the two headings or 24 ft. for each heading.

In the east entry of the railroad tunnel, where the rock is stable, the enlargement of the railroad heading is made in one operation by the blasting of rings of holes radiating from approximately the center of the heading to the neat lines of the full tunnel section, these rings being spaced four ft. center to center in the longitudinal direction. The muck is loaded in four-yard, three-foot gage, side-dump cars by an air-operated Osgood shovel mounted on three-foot gage trucks. The shovel has a one-yard dipper and is narrow enough to give ample space alongside for the loading of the cars, handled entirely in this case by electric trolley locomotives.

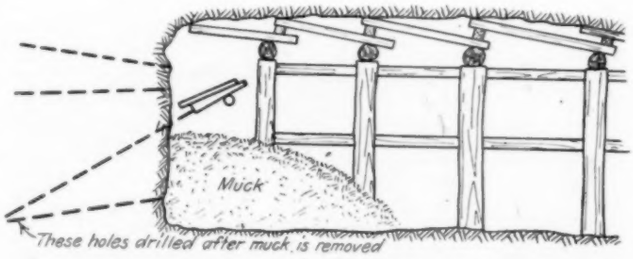
Under the normal procedure the empty cars are delivered on the shovel track directly behind the shovel and under an air operated derrick erected on the rear end of the shovel.



The Location of Typical Drilling in East Portal

This derrick lifts the empties one at a time as needed from the shovel track to the loading track. A second locomotive on the loading track takes care of the loaded cars. After a car is loaded opposite the front end of the shovel, it is pulled away far enough to allow an empty to be swung over from the shovel track to the loading track, which empty car is then pushed into loading position by the second locomotive. The loads are pulled in trains of 7 to 15 cars. Two shifts of eight hours each will readily remove the muck for 28 ft. of tunnel or at a rate that will insure progress equal to that in the headings.

The ring holes for the enlargement are drilled from a horizontal bar set up at about mid-height of the heading, using two drills, a Denver 74-W stopper drill for the upper holes and an Ingersoll-Rand R-72 drill for the lower holes. The proper procedure for the blasting has been the subject of much study. While the methods pursued have resulted in satisfactory progress, the manner in which the muck is disposed by the blast is not always such as to effect the best co-ordination of the shooting and mucking operations. Attempts to shoot the holes in complete rings gave unsatisfactory results because considerable of the muck was thrown back into the heading and covered up the holes of the succeeding rings. This led to the adoption of the plan now followed of blasting the top and bottom holes separately, the



Sketch Showing How Holes Are Drilled Before Muck Is Removed in Timbered Headings

lower holes being fired some four or more rings in advance of the upper holes. This gives a much more satisfactory disposition of the muck and approaches more nearly the ideal arrangement under which the muck pile nearly fills the entire tunnel section at all times and protects the shovel from the flying rock of subsequent blasts. The normal charge for each ring of holes is about 106 lb. of explosive.

Headings at West End Present Many Problems

As mentioned briefly above, the unstable nature of the rock encountered in the west end of the tunnel has given rise to methods entirely different from those followed at the east end. Moreover, it has been necessary to modify the procedure from time to time to meet the changing conditions as they were presented and to adopt a diversity of expedients as emergencies were encountered. The following is therefore but a general outline of the more common of the methods followed.

Owing to the fact that it has been necessary, with but few exceptions, to support the rock by timbering as rapidly as the headings are excavated, the heading gangs had to be organized to install the timbering as well as to do the drilling, shooting and mucking. This made it desirable to restrict each crew to a single heading instead of alternating from one heading to the other as at the east end. Therefore, to reduce the dead time of the drillers to a minimum while the muck was being removed, an arrangement of the drill holes was adopted which enables the drillers to cut all but four holes while working from the top of the muck pile after it has been leveled to about the mid-height of the heading.

As the softer rock requires only from 14 to 16 holes, from 10 to 12 of which are drilled before the muck is taken out, only two drills are used. They are operated from a horizontal bar set at about two-thirds of the height of the heading. The bottom four holes drilled from this position are pitched at a sharp downward angle so as to reach practically to the bottom of the heading, these four holes together with four others drilled close to the bottom after the muck has been cleaned out comprising the "cut" holes which are fired direct while the holes above are exploded with delay exploders. The muck is removed with the mucking machine as in the east headings.

The timbering for the headings consists of bents of round timber obtained locally, each bent consisting of a cap and

two posts. The spacing of bents varies with conditions, but averages about four feet. The bents serve as the support for spiles or poling boards which are driven toward the face and cantilevered forward and upward from the last bent placed to support the roof until the cap for the next bent forward can be set. The cap is supported by cantilever beams swung below the caps of the bent previously set until enough muck has been removed to permit the placing of posts. Longitudinal struts set between the posts add stability to the system and afford security against displacement during blasts.

To meet the problem of enlarging the railroad tunnel under the conditions encountered, the center heading is

Water Tunnel, One Mile Underground, Showing Motor Generator Set, Cross-Cut, No. 4 and Electric Motor

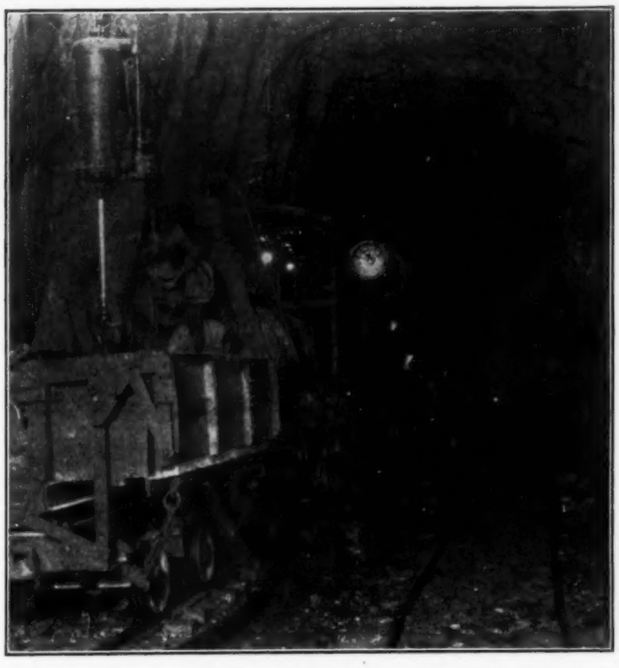
sloped up from each cross cut so that it becomes a top center heading with the roof at a sufficient elevation to clear the permanent arch timbers for the completed tunnel section. The enlargement has been carried out according to a variety of methods and studies for the development of still further plans are under way. However, the initial step—that of widening the heading to place the arch timbers—has been carried out in the same general manner throughout all of the enlargement work. The first step is to excavate to full width on both sides of the heading. In some cases this requires the placing of temporary or false arch timbers placed in an inclined position against the ends of the caps. In other cases the rock will stand at the sides until the permanent arch timbers can be set.

After the excavation to full width has been completed, the arch wall plates are carefully set to line and grade on each side, being blocked up on short blocks or pile stubs. The arch sets consist of either three or five segments of 12-in. by 12-in. timbers spaced from two to four ft. center to center. They are backed by four-inch lagging and the space between the lagging and the rock is packed with cord wood or selected rock. The posts of the heading timbering are cut off and removed as the arches are placed but the roof timbering remains in place, care being taken to wedge up between the permanent arches and the caps of the heading sets.

Enlargement Plans Were Revised

The original plan and one which was followed for several hundred feet of the enlargement was to remove the entire bench in one operation, using the air shovel for mucking, exactly as in the east end of the tunnel. This plan necessitated the employment of an ingenious needle beam rig to support the wall plates while the rock was being excavated underneath them for the purpose of setting the wall posts. However, when heavier ground was encountered this plan had to be abandoned as the side pressure became so great as to bend the 12-in. by 12-in. posts even where spaced two feet center to center.

This led to the decision to take the bench out in two cuts of approximately 8 ft. each and to the development of a design of side timbering that not only lends itself to the two-stage plan of taking out the bench but also affords a much stronger construction to resist side pressure. As shown in the cross section of the arch the side wall construction consists of alternate full length posts and trussed posts formed by battering two half-length posts outward from the top and bottom respectively with a 6-in. by 12-in. sub-plate between them at mid-height. After the upper sub-bench has been excavated and the wall plate of the arch is supported by temporary timbering, the upper set of batter posts is set in place on the 6-in. by 12-in. sub wall-plate, a batter post being set under every other arch while the intermediate arch is carried by a temporary plumb post. When the second sub-bench is removed these temporary posts will be replaced by the permanent full length posts and the lower set of batter posts inserted between them. The



Equipment for Shifting Four Yard Cars from One Track to Another in the Railroad Tunnel Ready for Loading with Air-Operated Shovels

side wall construction is lagged and packed as the work proceeds and the result is a timbering system of substantially elliptical section much better adapted to resist the side thrust than a wall with only full length vertical posts.

This plan of operation precludes the use of the power shovel for all mucking except that for the second sub-bench, and thus far all muck from the arch and upper sub-bench has been loaded into cars by hand, hauling it out through the cross cuts and the water tunnel or carrying it to the end of the bench and dumping it into cars on the lower level.

The enlargement process is necessarily slow but by carry-

ing on the work from several of the cross cuts simultaneously it is hoped to make progress proportionate to that in the headings.

The Power Plants

The power plants and other service facilities at the two portals are similar. Both plants are operated almost entirely by electricity from a 44,000-volt transmission line, built especially to supply power for the tunnel operations. This current is stepped down to 2,300 volts for the operation of the larger machines and converted by a motor-generator set to 250-volt direct-current for use in the trolley lines, lighting circuits, battery charging, etc. No steam plant is provided in the plant, all heating of buildings being done by hot air furnaces or stoves, with hot water heaters for service in the bunk houses, kitchens, laundry, etc.

The main features of the power facilities are the compressor plants, each of which contains four units. Thus the east portal plant is equipped with three Chicago Pneumatic Tool Company compressors with 20 by 12 by 14 cylinders and a rated capacity of 1,140 cu. ft. of free air each and one Ingersoll-Rand compressor with 7 by 13 by 10 cylinders and a rated capacity of 420 cu. ft. The equipment at the west portal is similar except that the large compressors were supplied by the Ingersoll-Rand Company.

The Mucking Machine Loading a 50-ft. Car in Two Minutes

Water is obtained by gravity from mountain streams at adequate pressure for all service, but pumps, both electric and gas-engine driven, are provided to insure against failure of supply. Adequate fire protection is assured by systems of four-inch fire mains with well distributed hydrants with hose already attached and boxed ready for immediate use.

Drill Repair Shop an Important Feature

Another important feature of each plant is a well appointed drill repair shop. That at the east portal is equipped with two Sullivan drill sharpeners, three distillate oil furnaces, a quenching tank and a forge for miscellaneous work. In this plant some 2,000 drill steels are resharpened and tempered daily by two shifts of six men each.

Other facilities include a machine shop, a store house, a battery charging room and repair shop for motors, a magazine having a capacity of one carload of explosive, placed at a considerable distance from the camp with smaller powder houses at the plant for the storage of a day's supply and the preparation of charges.

Careful attention was given to the matter of ventilation in the tunnel. Here again the twin headings proved of considerable advantage since the placing of bulkheads in the cross cuts made it possible to use one bore as an intake and the other as an exhaust duct. To clear the heading of gas incident to blasting, two rotary Root blowers of 3,840 cu. ft. capacity per minute and a Buffalo conoid fan are installed outside a bulkhead in the water tunnel some distance to the rear of the last cross cut. The blowers are connected to 12-in. ducts leading to the ends of the two headings, while the fan discharges into the tunnel, just beyond the bulkhead. The effect of this arrangement is to drive the air from the headings out through the main tunnel, that from the water tunnel heading passing out through the forward cross cut and thence out through the main tunnel.

Camps Are Maintained to High Standards

The construction contract contains unusually explicit stipulations concerning the character of the construction camp and the measures to insure proper maintenance. Close conformity with these provisions has resulted in the development of a camp of exceptionally high standard. In addition to unusually well appointed bunk houses and a mess hall, the facilities at each camp include a laundry, a lavatory, locker and drying house, hospital, post office, a school for the children of the employees, and a recreation hall which houses a pool and card room and a hall used for both moving picture shows and dancing.

As soon as the work in the east headings could be put on a thoroughly systematized basis, a bonus system was established to stimulate progress. Under this plan two assistant superintendents and all men in the three heading shifts participate in premiums paid for production in excess of a base of 510 ft. for each 15 days in both headings (an average of 17 ft. per day for each heading). Separate premium rates are set up for each of three groups of men, based on the relative influence which their work has on the progress made and in addition there is a sliding scale of bonus increases for increased progress as set forth in the table below.

	Bonus per foot of advance of the two headings		
	Group I	Group II	Group III
For each foot over 510 ft. but less than 600 ft.	15 cents	10 cents	5 cents
For each foot over 600 ft. but less than 675 ft.	20 cents	12 cents	7 cents
For each foot over 675 ft.	30 cents	18 cents	10 cents

An average maximum rate of progress of 25 ft. per day has not been maintained for any considerable period but sufficient advances have been made to require the payment of bonuses of $30 to $40 to drillers and other Group I men for the 15-day period. Approximately 600 men are employed on the work, 250 at the east portal and 350 at the west portal.

The tunneling operations are being directed by the members of the contracting firm, F. C. Hitchcock and C. C. Tinkler. D. S. O'Rourke and William Fowler are superintendents at the east and west portals respectively. The Moffat Tunnel Commission, of which W. T. Robinson is president, maintains close supervision over the work through its chief engineer, R. H. Keays, who is assisted by C. A. Betts, office engineer, Burgis G. Coy and V. A. Kauffman, resident engineers, and a considerable engineering staff.

A Coroner's Jury at Chicago has rendered a verdict holding that the responsibility for the disaster at North avenue, Chicago, on November 2, when freight cars of the Chicago, Milwaukee & St. Paul crashed into a street car, killing ten passengers, lies at the door of the officers and employees of the railroad; and recommends that William H. Barbour, yardmaster, William H. Ingraham, assistant superintendent of terminals, and Mathew D. Gaskett, switchman, be held for the grand jury, on a charge of manslaughter. The jury also recommended that an ordinance be passed requiring every freight and every passenger train to be brought to a full stop at every street crossing.

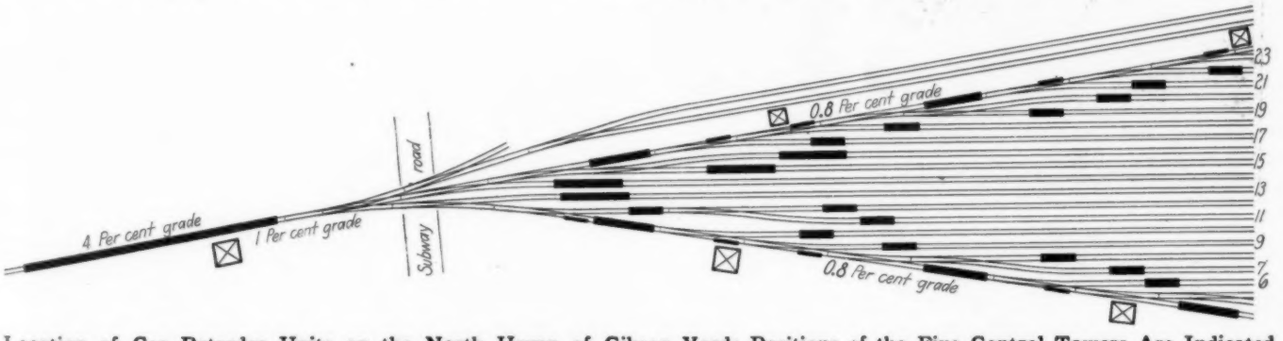
Looking Down from the North Hump of the Gibson Yard

Hump Yard Operates Without Car Riders

Pneumatic Car Retarders Increase Capacity and Safety at Gibson Yard of Indiana Harbor Belt

ALL CAR RIDERS have been eliminated on the north hump of the Indiana Harbor Belt freight classification yard at Gibson, Ind., as a result of installing a pneumatic braking system, developed under the direction of George Hannauer, vice-president. Experiments with the braking units, or car retarders as they may be called, have been conducted since November, 1923. The units are built into the track at various points as required from the hump down through the yard, and are designed primarily to enable the speed of freight cars released at the hump to be governed from several control towers without the use of individual car riders. While this development is subject to further alteration and refinement, its success is amply demonstrated by the results already accomplished. These results may be summarized as follows: (1) All car riders on the north hump are dispensed with, thus saving the labor of 66 men, or approximately $385 a day with the present volume of business; (2) cars are spaced more uniformly and closely with a consequent potential increase in yard capacity; (3) complete control of cars on the grades prevents rough handling and damage claims; (4) the use of an outside braking medium obviates the necessity of preliminary train brake tests; (5) the elimination of car riders promotes safety, particularly in winter when the cars, ladders, hand holds and hand brake wheels are often covered with snow and ice; (6) the provision of a mechanical device for placing skid shoes or skates on the rails at the will of the tower operators removes the danger from this operation.

The idea of installing some sort of a braking device at freight classification hump yards to obviate the necessity of employing car riders is not new but it is believed that the development at Gibson is the first practical and successful application of the idea. The entire equipment including car retarder units, tower control equipment and skate-throwing machines is covered by patents held by George Hannauer, vice-president, and E. M. Wilcox, master car builder of the Indiana Harbor Belt.



Location of Car Retarder Units on the North Hump of Gibson Yard; Positions of the Five Control Towers Are Indicated by Crossed Squares

Cars Handled Per Man Increases 84 Per Cent

The function of the car retarders in saving labor will perhaps be better appreciated from an examination of figures showing the cars handled and men employed in October of the present year as compared with October a year ago. There are two humps in the Gibson yard and on October 23, 1923, a total of 2,665 cars were handled over both humps with 105 car riders and switch tenders, or an average of practically

25 cars per man. On October 23, 1924, after installation of the car retarders, 1,667 cars were handled over the north hump with a total of 39 men including 24 switch tenders and 15 car retarder operators. In other words practically 43 cars were handled per man, an increase of 84 per cent. It is expected that a still further reduction in force of 12 men will be made following the installation of power switch-throwing machines in place of the hand-operated switches now used. The best performance on the north hump to date, using the car retarders instead of individual car riders is 1,042 cars in eight hours. In one case 220 cars in three long trains were handled over the hump in 80 minutes, but this represents a performance above the average.

In addition to the increased capacity and safer operation resulting from the use of the car retarders a better class of men can be employed. The night hump car rider's job is the most hazardous and least desirable position about the yards and consequently the one on which new men break in. Obviously the difficulty of getting men of desirable qualifications to enter railroad service at freight car yards is directly proportional to the unattractiveness of this work.

General Method of Operation

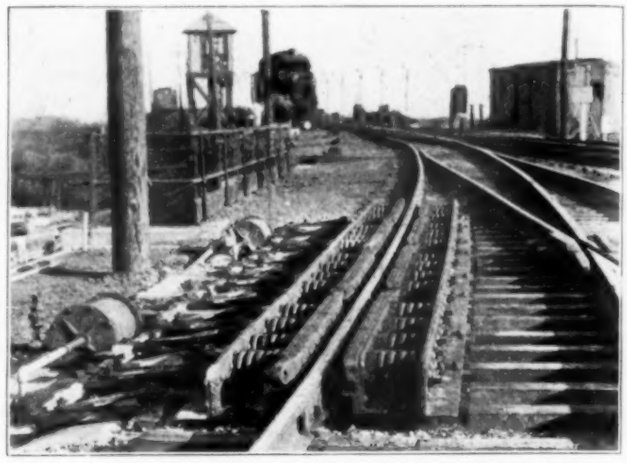
There are a total of 51 car retarder units in the yard, varying from 24 ft. to 40 ft. in length and located as shown

Box Car Entering Car Retarder on the Hump; Special Spring-Supported Brake Shoes Grip the Sides of the Wheel Rims with a Pressure Controlled by the Operator in the Tower

in the drawing. They are operated from the five control towers, indicated by crossed squares in the yard plan, through the proper manipulation of certain straight air valves and electric lever switches. When a car is released at the hump it enters the first car retarder unit and the sides of the wheel rims are gripped by special spring-supported brake shoes with a pressure determined by the tower operator in accordance with his advance knowledge of the weight of the car and probable braking effort necessary to retard it the required amount.

The car then passes on to the car retarder units controlled from the second and in the case of the most distant tracks, from the third tower. It passes the last tower with just enough speed, as determined by the judgment of the tower operator, to carry it to the last car on the particular track to which it is switched. The towers are in constant intercommunication by means of loud speakers, and the transmitters are so placed that the operators can talk while still watching the track and operating the levers. In case of necessity skates can be placed on the rails by the operation of suitable valves in the control towers. The provision of the skate-throwing machines is a decided safety feature since it obviates the necessity of a switchman ever placing a skate in front of a moving car. A field man at the far end of the yard sets the brakes and prevents the cars bumping out. This man is also available when it is necessary to push down the cars on any track.

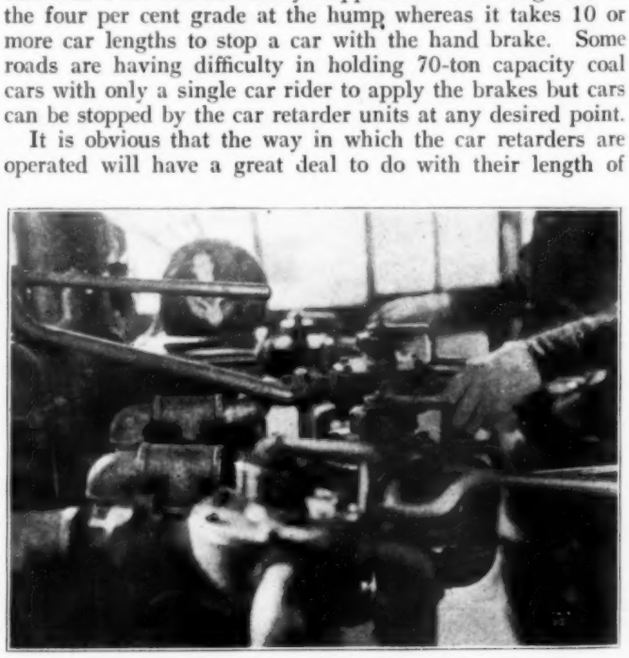
The effectiveness of the car retarders is indicated by the



Car Retarder as Applied to Single Rail; the Special Renewable Brake Shoes Are Clearly Shown

fact that a car can be readily stopped in the braking unit on the four per cent grade at the hump whereas it takes 10 or more car lengths to stop a car with the hand brake. Some roads are having difficulty in holding 70-ton capacity coal cars with only a single car rider to apply the brakes but cars can be stopped by the car retarder units at any desired point.

It is obvious that the way in which the car retarders are operated will have a great deal to do with their length of

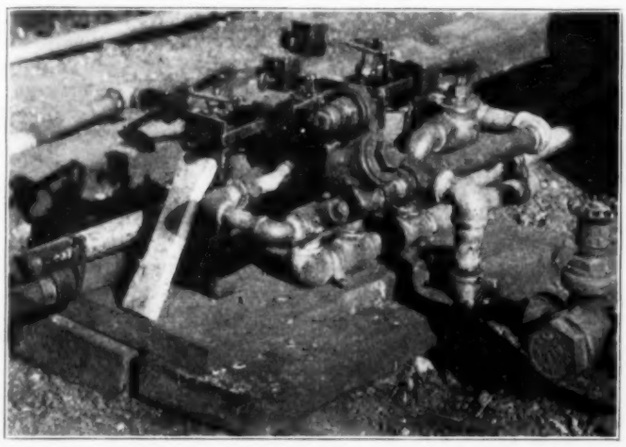


Car Retarder Operator Manipulating Straight Air Valves; Switch Control for Electro-Pneumatic Unit Shown in the Background

service. In other words, if the operators allow a car to attain a considerable speed, much more braking power in the aggregate is required at the last car retarder than if the speed of the car is kept at a desirably low point by light applications of pressure as it passes each of the retarders. Complete control of even the heaviest cars enables them to be spaced uniformly and put over the hump at the rate of

three a minute. A continuous handling of cars at this rate, however, would require a large volume of business and the services of three engines in the receiving yard to get the cars up to and over the hump as fast as they can be disposed of.

The duties of the tower operators consist of controlling the retarders, operating the power switches (all of which are not



Electro-Pneumatic Unit Which Gives Instantaneous Braking Action and Saves Piping and Air

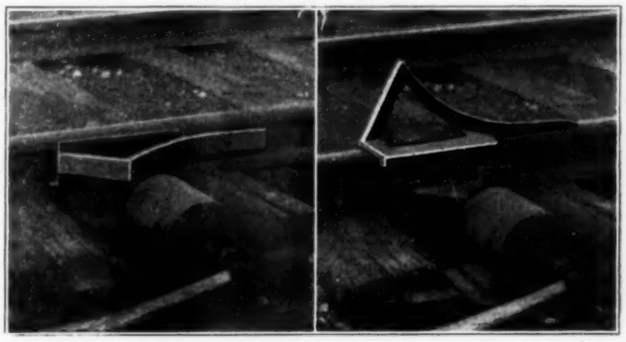
now installed), and operating the skate-throwing machines. These men work on three shifts. A vital feature of their work is the study of accurate switching lists showing the amount of load. In other words, the tower operators must know in advance something about the weight of each car to assist them in making the required brake retarding effort.

The switching list as now prepared shows the number of cars in incoming trains in numerical order with the car number, railroad and condition as regards load or empty. The letters *LL* indicate a light load, *XL* heavy load, *L* ordinary load, and *E* empty. The destination of the cars is also shown on the switching list, bad order cars being indicated so that they can be switched to the repair track. It is the intention in the near future to change the load column on the switching list to show only the total weight of the loaded car and thus give the tower operators a more accurate indication of what will be required in the way of braking effort.

The car retarders may be applied to both rails of the track or to a single rail. It was at first thought that the application of pressure to the sides of the wheel rims on only one side of the car would have an undesirable swiveling action on the trucks but experience showed that this effect is not produced and as a consequence the application of the car retarder units, particularly opposite switch points, is greatly simplified.

Electro-Pneumatic Operation Planned

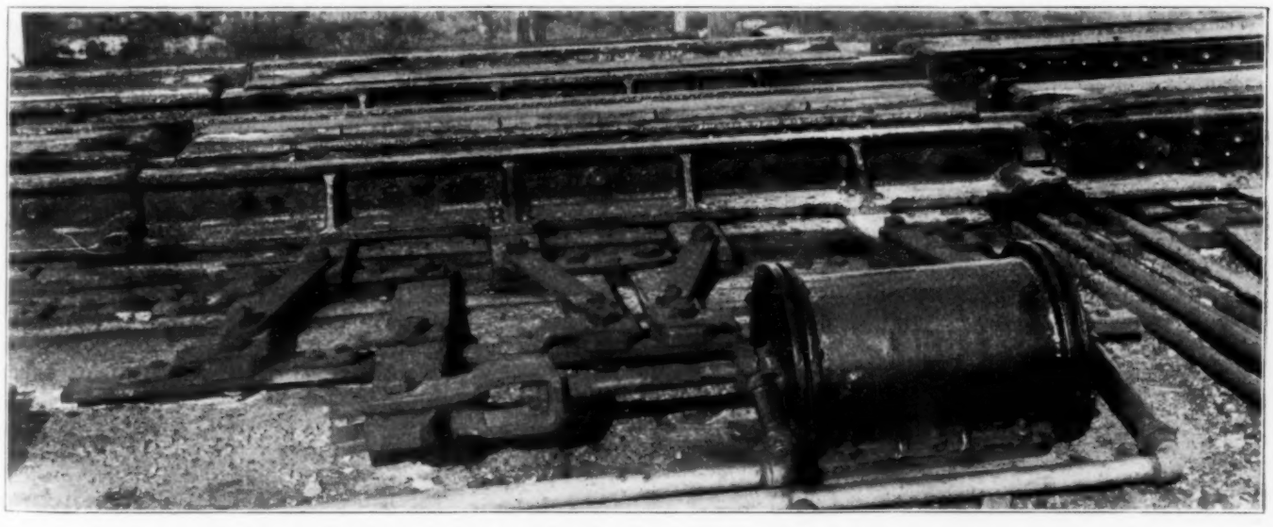
While under the present design most of the car retarder units are operated on a straight air system, electro-pneumatic operation has been tried successfully with a single unit and will be provided for all in the near future. Air pressure in the brake cylinders will continue to supply the power but it will be controlled by valves electrically operated from the towers. Electro-pneumatic operation will result in a con-



Typical Skate-Throwing Machine Before and After Operation; Control Is from the Nearest Tower

siderable economy in air, afford a more prompt and accurate control of the car movement and the piping will be far less extensive and complicated.

With the straight air system any pressure can be obtained in the brake cylinders from 20 lb. to a maximum of 105 lb., but it requires a constant adjustment and readjustment of the handles of the straight air valves. Experience with the single electro-pneumatic unit now in service shows that two or at most three pressures will be adequate. The operator will simply throw the switch to one of these positions, dependent on the total weight of the car and its load, and when the car has passed his tower throw the switch to the release position. This will greatly conserve the tower opera-



Close-up View Showing Supporting Angles, Brake Shoes, Brake Cylinder and Operating Levers

tor's time, enabling him also to operate the power switches.

The arrangement of a car retarder unit including supporting angles, brake shoes, brake cylinder and operating levers is illustrated. The brake shoes are subject to wear and renewable, provision being made in the design to reverse the shoes as their condition of wear may require, and to take up slack.

At present, plans are under way to fit the car retarding system at Gibson to meet winter conditions based on the experience in January and February of this year. There seems no doubt of its success, however, as an all-year-round device and in view of the results accomplished and interest created its use will probably be extended to other freight classification hump yards in the coming year.

Results of the Election

WASHINGTON, D. C.

THE TRIUMPHANT ELECTION of President Coolidge and of a working majority for the Republican party in both houses of Congress, particularly as it carried with it the overwhelming defeat of Senator La Follette and his anti-railroad ideas, seems to place the country squarely behind the transportation plank in the Republican platform adopted at Cleveland favoring "a stable, consistent and constructive policy toward our railroads." While the platform also calls for modification "from time to time, as experience shows the necessity therefor, of the present laws relating to railroads which were enacted to meet post-war conditions," the declarations as to the kind of modifications are not at all specific and it is not to be expected that efforts will be made to do much in the way of railroad legislation, at least until after the new Congress comes in. If proposals are then made it is to be anticipated that only those of a constructive character will have the support of the administration.

The new Congress just elected does not come into existence until after March 4 and for the short session which begins in December the Congress will be the same as that of the last session in which efforts were made, particularly by the radicals and to some extent by the Democrats, to bring about some radical changes in the transportation act. There has been some talk of an extra session to be called after March 4 to consider tax reduction, but the official word from the White House is that nothing along that line has been decided upon. As the balance of power held by the radical-progressive bloc, at any time when they were able to combine with the Democrats, will exist only until March 4, an effort may be made during the short session to push to a vote the Howell-Barkley bill, which is on the House calendar but which was only reported to the Senate on the last day of the last session. Executives of the railroad labor organizations held a meeting at Cleveland, on November 8, to consider plans for pressing for action on this bill. The Republicans were able to keep the bill from coming to a vote at the last session and in view of the crowded condition of the calendar during a short session which must be devoted mainly to appropriation bills they may be able to do so again. Moreover, with Coolidge elected, some of the nominal Republicans who have been voting as Progressives or with the Democrats may be expected to be less inclined to stray from the fold hereafter, and in any event no one expects that the bill would ever receive the signature of the President or command the two-thirds majority necessary to pass it over a veto.

The Republican platform favors "a careful and scientific readjustment of railroad rate schedules, with a view to the encouragement of agriculture and basic industries, without impairment of railroad service"; President Coolidge has expressed himself in favor of such a policy, and the Hoch-Smith resolution, which was intended to accomplish the purpose, has been passed in the House and could probably be passed in a short time in the Senate. Although the agricultural condition which was the cause of the proposal has so greatly improved recently as probably to have greatly reduced the demand for such legislation, Senator Capper and some others have announced their intention of pressing it. Efforts may also be made to put through the House the Gooding long and short haul bill, which passed the Senate, and also the Pullman surcharge bill, but here again the usual conditions of a short session will militate against any action and the Interstate Commerce Commission is likely to render a decision on both points before the session is over.

The Republican platform also says that "the consolidation of railroads into fewer competitive systems, subject to the approval of the Interstate Commerce Commission, should be provided for," and the Cummins bill, which includes many amendments to the present consolidation law intended to expedite the consolidation process by holding forth inducements to voluntary action, has the approval of the Coolidge administration and would undoubtedly be taken up after the Sixty-Ninth Congress meets. Another clause of the platform declares for amendment of the labor provisions of the present law "whenever it appears from experience that such action is necessary," but no specific plan is proposed.

On the whole, therefore, aside from a possible fight over the Howell-Barkley bill, it would appear that the railroads are assured of a further period of comparative freedom from legislative disturbance.

The new Senate, assuming that Republicans will be elected in Massachusetts and Connecticut to succeed the late Senators Lodge and Brandegee, apparently will have 55 Republicans to 40 Democrats and 1 Farmer-Laborite, but as five of the so-called Republicans are definitely aligned with the La Follette bloc—La Follette himself, Frazier and Ladd of North Dakota, Norris of Nebraska and Brookhart of Iowa, who seems to have squeezed through, pending a recanvass, the actual number of regular Republicans to be counted on is reduced to 50 against a possible combination of 46 votes against them. On the other hand there are a few others claiming to be regular Republicans who are sometimes grouped with the radicals on railroad questions and some others.

In the House the Republicans will have a greater margin, with a total of 247 seats, as the returns stand at this writing, against 183 for the Democrats, 3 Farmer-Laborites and 2 Socialists. This is a gain of 22 for the Republicans and gives assured control, although an uncertain number of them is to be classed with the Progressives.

The Republican control of the Senate would seem to assure a reorganization of the committee on interstate commerce, of which a Democrat, Senator Smith of South Carolina, was elected chairman at the last session by a combination of the Democrats and the La Follette group. No change in the membership of the committee was made by the election, although there will be a vacancy because Senator Elkins of West Virginia was not a candidate for re-election. In the House Committee on Interstate and Foreign Commerce there will be three vacancies because of the retirement of Chairman Winslow, of Massachusetts, and Representatives Sanders of Indiana and Graham of Illinois, who did not run for re-election. All the others were re-elected. Representative J. S. Parker of New York is the ranking Republican of the House committee to succeed Mr. Winslow.

While the railroad labor organizations that were so active in the campaign for La Follette may have been more successful in their non-partisan Congressional campaign than in the presidential race, a check of the list of new members of Congress against the list of candidates endorsed by the American Federation of Labor and the Associated Railroad Labor Organizations, largely on the basis of the votes on the Howell-Barkley bill, shows that their recommendations were very largely disregarded by the voters. Although many can-

didates who were on their list, as published in the issue of "Labor" for October 18, were elected, a large percentage of them are included among those who naturally would have been elected anyway, as in the case of the Democrats in the solid South. Of those on an earlier list whom labor was urged to defeat, nearly all were re-elected.

Labor endorsed 24 candidates for the Senate, of which 14 were elected and 10 were defeated. As 32 Senators were elected in all this means that 18 were elected without having the endorsement of the labor organizations. For the House the labor organizations had endorsed 274 candidates, of which 177 seem to have been elected, according to the unofficial returns, and 97 were defeated, so that 258 of the 435 members of the House elected did not have the labor endorsement. Of those who were endorsed and were elected no less than 75 were included among the Democrats from the states of the solid South that elected no one but Democrats, while many more from other states undoubtedly were elected for other reasons than the support of the labor organizations. Several local officers of the railroad labor organizations were among those defeated. W. N. Doak, vice-president of the Brotherhood of Railroad Trainmen, who ran unsuccessfully for a seat in the Senate from Virginia, was not endorsed by the labor organizations.

Why Not Use the Standard Invoice Form?

By Ray M. Hudson

Chief, Division of Simplified Practice, U. S. Department of Commerce, Washington, D. C.

IN OFFICE WORK, the payroll is usually regarded as the greatest item of expense. So long as roundabout methods or practices, or time absorbing "forms" are continued in operation, the greatest expense in office work will *not* be the useful, *but the unnecessary or useless,* work performed. The difference in cost of office work done under highly individualistic methods and that of work done under simplified and standardized methos is an economic waste.

The truth of this statement is borne out in the effort of the National Association of Purchasing Agents to secure nation-wide adoption of its standard invoice form. There are four fundamental steps in every purchasing transaction. They are

1. Inquiry,
2. Selection,
3. Purchase, and
4. Payment.

These four essentials are present in every purchase, whether it is buying a cigar or a hundred locomotives.

It is only natural, therefore, for men who are specializing in this most important function of modern business to seek the shortest, simplest, and most effective method of handling each of these four elements and promote that method as "standard practice." It is also only natural that such reduction of widely diversified to highly standardized practice results in proposing standard forms for recording the basic facts of each transaction. That standardization does eliminate waste is too generally known to require further treatment here. The main problem in this case, as in any other instance of standardization, is to secure recognition, adoption, and observance of the standards. Standards do not "sell" themselves. They come into use only as the advantages and benefits in their use become more generally understood.

The proposed standard invoice form was developed through study of thousands of invoice forms used in many lines of business. Analysis of their individual features showed certain terms, expressions, and other data recurring with great frequency. Certain ones were common to all—here and there occurred some one word or abbreviation peculiar to some one line of business, but not common to another. Such exceptional instances, no doubt, will continue to be found even when the standard invoice form is universally used, but their existence does not prevent the adoption of that standard form as basic, even in a highly specialized field.

Thirty Trade Associations Interested

It is a well known fact that many of the invoice forms used by the railway supply houses are furnished by the railroads buying from those houses. This is done chiefly because different carriers have different ideas about the data essential in their accounting practices. This is not a new situation—the same state of affairs, to a much greater degree, existed when the Railway Accounting Officers' Association began its splendid work of unifying railway accounting practices. The surprising part of the present hesitancy to adopt the standard invoice form is, in view of the widely-recognized and admitted advantages in the work of this progressive organization, that any such hesitancy should exist or appear in this case. Especially is this true, when one considers that the proposed invoice form, even though it was initiated by the National Association of Purchasing Agents, has been developed through the co-operation of the Railway Accounting Officers' Association, the National Association of Cost Accountants, and Division VI—Purchases and Stores, of the American Railway Association. Not only have these four leading groups adopted this form as their standard, but nearly 30 other national trade associations covering widely different fields are actively promoting its adoption and use among their respective members.

Undoubtedly the railway supply companies would like to simplify their office methods by using this form. The inconvenience of the present wasteful variety of invoice forms is of course objectionable from their point of view—but what about the errors, confusing delays which such variety breeds? What about the yards of correspondence, the hours of dictation, the reams of paper and the postage, and a hundred and one other costs which so often are necessary to clear up misunderstandings, etc., arising out of the lack of uniformity in so simple a matter as this? The only sure way to stop such wasteful expenditures—wasteful because unnecessary and avoidable—is to stop them at the source. When a crew of billing clerks has one form instead of a hundred different ones to work on, accuracy and speed both increase. Performance is not only more rapid but is also more certain. The vendor's office costs are more likely to remain constant under an increased volume of business, or to decrease with a given volume. In either case, the purchaser gains through better service, oftentimes through lower prices, and sometimes through both.

Standardization—a Waste Elimination Process

Simplification and standardization can be applied in the office in the same practical common sense manner in which they are applied in the shops. Form standardization is steadily being recognized as a waste-eliminating process in many lines of business. Not only does the use of standard forms result in a saving of time, but difficulties are avoided that a number of similar forms for the same purpose would be certain to create. As important as any of these reasons is the economy effected. Standardization means that we can apply a uniform method of manufacture, not disturbed by conflicting specifications such as difference in sizes, color of ink, grade, weight and color of paper, etc. Therefore it costs less to produce standard forms and the saving is reflected in the price. The spread of the idea reflects the

standardization of American business procedure on the best way to accomplish a desired result. The savings in clerical expense, printing, "adjustment or correction" costs, and many other items are the profit-making by-products of this process. The forms are merely the means to the end which is sought.

The National Association of Purchasing Agents is meeting with much success in the adoption of its standard catalog size—its standard contract forms for coal, for pig iron, etc., and its standard purchase order form.

The National Association of Credit Men is working on the standardization of forms having to do with credits. The American Acceptance Council is developing a standard commercial credit letter. The American Bankers Association has long been active in the standardization of check sizes. Other groups such as the American Warehousemen's Association, the Foreign Freight Forwarders, etc., are working on the simplification and standardization of the forms used in their respective fields. The Federal government itself is also very actively engaged in this direction through the work of the Bureau of the Budget's Committee on Simplification of Office Procedure.

The reasons for such general and wide-spread interest and activity are obvious. They may all be summed up in lower costs, greater savings, greater profits. There is no question but what, in many fields, the profits of the future will be found in the wastes of the present.

A Possible Saving of $15,500,000

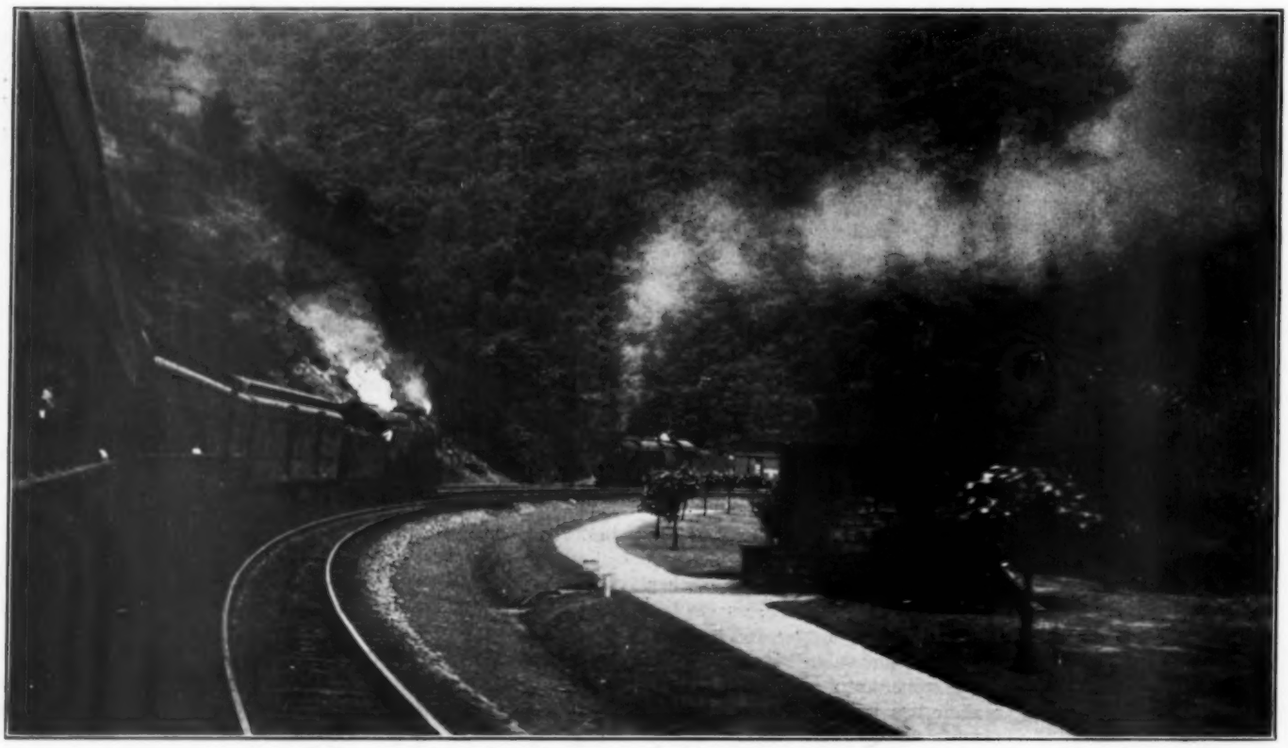
Thirty-five business corporations of average size were recently asked to estimate what, in the opinion of their officers, might be saved in their purchasing and accounting departments if all invoices received by them were on a national standard invoice form. If these corporations estimated correctly, the annual saving of 25,000 concerns of corresponding size in the United States, Canada, and Mexico would amount to $15,500,000. If we discount this figure for the purpose of being conservative, the potential savings would still run into the millions of dollars.

A typical illustration of the savings possible through simplification of office procedure and consequent form standardization is found in the adoption of through way billing for all interline shipments, as advocated by the Railway Accounting Officers' Association for the past 30 years. It is said this would materially reduce delays to traffic at junction points, and save at least $20,000,000 annually to the carriers for clerk hire, and in undercharges due to errors in way-billing.

The possibilities for equivalent savings through the maximum use of the standard invoice form appear to be fully as great. "The principle is well recognized that carriers should account in a uniform manner for their interline transactions. Uniformity in this respect promotes fairness, fosters impartiality and is necessary in the interest of the efficient and economical accounting among carriers." Why should not this principle apply just as fully between the carriers and those from whom they buy? Vendors appreciate fairness, impartiality, and efficiency fully as much as purchasers do.

Why not then be as fair with them as you want them to be with you? Why not put this modern waste-eliminating, money-saving, profit-making device into general practice? Why not use the standard invoice form?

THE DETROIT, TOLEDO & IRONTON, aiming to provide safety in the greatest possible degree, has established a rule requiring that when cars are being pushed, particularly in yards and on industrial tracks, a brakeman must be stationed on the leading car, and he must have a mouth whistle. The same rule applies when yard engine, either pulling cars, or without cars, is moving backward; the brakeman must be on the footboard of the tender.



On the Horseshoe Curve, P. R. R.

General News Department

The Mobile & Ohio has granted an increase of $16.05 a month in the pay of train dispatchers, making the monthly rate for trick, relief and extra dispatchers $250.

The Interstate Commerce Commission has granted the petitions of the Chicago, St. Paul, Minneapolis & Omaha and the Western Maryland for relief from its train control orders of June 13, 1922, and January 14, 1924.

J. E. Skaggs has been elected president of the Southeastern Express Company, in place of J. B. Hockaday, deceased; headquarters at Atlanta, Ga. Mr. Skaggs heretofore has been general manager. He entered the express service 31 years ago, as a wagon driver.

By a fire at Stockton Springs, Me., on November 8, three large docks, together with a number of buildings, belonging to the Bangor & Aroostook, were destroyed. One of the piers was 1,760 feet long; estimated loss, including a large schooner and quantities of lumber, $500,000.

The Southern & Southwestern Railway Club will hold its annual meeting at Ansley Hotel, Atlanta, Ga., on Thursday, November 20, beginning at 10 a. m. There will be a paper, The Three-Cylinder Locomotive, by James Partington, of the American Locomotive Company. The election of officers is scheduled for this meeting.

The National Highway Traffic Association will hold its annual meeting at the new clubhouse of the Automobile Club of America, 12 East 53rd street, New York City, on the afternoon and evening of December 3. Among the subjects for discussion are the question of state fees for commercial motor vehicles operating as private and common carriers, and a committee report on weights, dimensions and speeds of tractors, trailers and semi-trailers.

The railroad labor brotherhoods will bring all their influence to bear on the Congress which will re-convene in December to secure the passage of the Howell-Barkley Railroad Labor Bill. Plans for a legislative campaign were made at a meeting in Cleveland, Ohio, on November 8, when the chief executives and other representatives of 20 railroad brotherhoods and affiliated labor organizations convened at the invitation of Warren S. Stone, chairman of the Brotherhood of Locomotive Engineers. The labor provisions of the Transportation Act were declared by delegates at the meeting to be a "complete failure."

The Railway and Locomotive Historical Society has issued its eighth bulletin, a pamphlet of 87 pages, containing, as usual, an interesting variety of information about old locomotives, particularly those of New England. A descriptive list of locomotives of the Old Colony Railroad fills 33 pages. There is a picture of "Locomotion No. 1," the pioneer locomotive of the Stockton & Darlington, which for many years has stood on a pedestal at the Northeastern railroad station in Darlington (England). It is stated that this engine, which began its career in 1825 and was taken out of service in 1841, has been sent away from its home a half dozen times, going to various exhibitions, including that at Philadelphia, in 1876 and the British Empire exhibition of the present year.

Correction—National Safety Council

The report of the fifteenth annual congress of the National Safety Council, published on page 647 of the *Railway Age* of October 11, was incorrect with reference to the statement that safety committeemen on the Baltimore & Ohio are rotated once a month for they are rotated once in every six months. Also D. E. Satterfield, who was identified as an officer of the Baltimore & Ohio, is, instead, connected with the Chesapeake & Ohio.

Valuation Conferences on the P. R. R.

The Interstate Commerce Commission has selected the lines formerly known as the Southwest system of the Pennsylvania for the second of the experimental valuation conferences, to be held in advance of the hearing on the carrier's protest against the tentative valuation, for the purpose of simplifying the issues and arriving at agreements with respect to controverted points. The commission some time ago authorized a trial of this plan in two cases and the Atchison, Topeka & Santa Fe was selected for the first trial. The conference with the Pennsylvania lines, representing about 4,000 miles will begin on December 4.

Texas to Combat Grade Crossing Danger

The Texas Council of Safety is to be constituted at Austin, on December 4, with a view to organizing the efforts of public officers and others toward the promotion of safety at highway crossings, the purpose being to do whatever is possible to educate the people, to promote the adoption of union crossing signals and to secure necessary legislation. This movement is the result of a preliminary conference which was held, at the call of the State Railroad Commission, in Austin on November 7, and was attended by the railroad commissioners, representatives of the principal railroads, and by Highway Commissioner D. K. Martin, accompanied by officers of his department. Temporary organization was effected with Chairman C. E. Gilmore, of the railroad commission, as chairman, and Highway Engineer Gilchrist as secretary. It is proposed to invite the co-operation of civic clubs, automobile clubs, chambers of commerce, large oil producing companies, and all others interested whose co-operation seems likely to be useful.

Points for the Fire-Prevention Inspector

G. H. Scott, a fire-prevention inspector on the New York, New Haven & Hartford, in his prize paper read at the recent Richmond convention of the Railway Fire Protection Association, devoted himself mainly to the points which an inspector should study in connection with his desire or purpose to most thoroughly qualify himself to fulfil his official functions in the best manner. Mr. Scott said among other things:

The inspector is the one with whom great numbers of employees come in personal contact. He can be likened to a salesman engaged in selling fire prevention methods. Reasoning along these lines he should know his line thoroughly; be enthusiastic about it; and able to talk intelligently about it; avoiding all technical terms. He should possess or cultivate a personality that will get things done with the least amount of fuss. When starting an inspection of a property try to have the officer in immediate charge, or some assistant whom he may delegate, accompany you. This man will become more familiar with fire prevention methods in this than in any other way, if you make your inspection thorough. If he is handled properly the knowledge that he gains will result in his continuing to correct dangerous conditions after you leave. If pressure of business it impossible for the official in charge to spare anyone to accompany you, go back to his office before you leave and talk things over with him. If he disagrees with you try and see his side of the case, and if he is right admit it. Such treatment is appreciated and it usually results in immediate co-operation, which is the result we really are after. Of course, this method will not work in all cases.

In making your recommendations it is most important to consider them from all angles; one foolish recommendation will do much to defeat a hundred good ones. A short, clear and concise report is a big help in getting the attention of busy officers. Tedious reports are referred to some minor clerk or are filed in the wastebasket. The inspectors on our line are required to attend all monthly Efficiency Committee meetings on divisions, at which are discussed the causes of all fires during the preceding month and the lessons to be learned from them. These committees are composed of workers from every branch of the service.

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF SEPTEMBER AND NINE MONTHS OF CALENDAR YEAR 1924

Name of road	Average mileage operated during period.	Operating revenues				Operating expenses										
		Freight.	Passenger.	Total (inc. misc.)	Maintenance of Way and structures.	Maintenance of Equipment.	Traffic.	Transportation.	General.	Total.	Operating ratio.	Net from railway operation.	Operating income (or loss).	Net after rents.	Net after rents, 1923.
Akron, Canton & Youngstown	170	$254,322	$503	$266,281	$30,416	$22,783	$9,872	$69,276	$10,369	$142,716	53.60	$123,565	$112,839	$80,567	$28,311
Alabama & Vicksburg	170	1,972,604	6,274	2,035,728	275,853	205,922	86,376	567,889	88,910	1,222,079	59.40	833,649	715,710	473,001	377,554
Vicksburg, Shreveport & Pacific	141	243,690	63,306	328,905	55,047	73,425	10,230	101,116	12,963	254,923	77.50	73,982	47,935	31,795	57,018
Ann Arbor	141	1,887,744	568,580	2,634,845	441,729	535,821	86,684	883,918	124,241	2,089,771	79.30	545,074	325,512	361,253	439,982
Atchison, Topeka & Santa Fe	188	270,499	74,720	373,560	76,475	37,001	$9,872	$69,276	$10,369	$142,716	53.60	$123,565	$112,839	$80,567	$28,311
	188	2,139,340	780,108	3,143,319	567,188	$06,898	86,376	567,889	88,910	1,222,079	59.40	833,649	715,710	473,001	377,554
	293	431,461	31,987	483,555	68,881	105,652	10,230	101,116	12,963	254,923	77.50	73,982	47,935	31,795	57,018
	293	3,520,121	347,510	4,038,393	525,414	769,119	86,684	883,918	124,241	2,089,771	79.30	545,074	325,512	361,253	439,982
Gulf, Colorado & Santa Fe	9,120	14,564,883	3,244,733	19,204,783	2,590,417	3,569,556	306,651	5,161,014	360,932	11,912,310	72.60	102,305	78,470	60,939	57,231
	9,048	94,806,074	33,071,975	140,015,043	22,784,171	33,644,241	2,735,549	45,063,215	3,149,622	106,383,267	76.00	690,112	488,729	353,881	567,909
	1,908	2,607,242	354,598	3,100,543	435,532	449,905	43,551	754,825	62,964	1,744,411	56.30	1,356,132	1,263,961	65,374	61,831
	1,908	15,709,294	3,018,650	19,868,749	4,240,695	4,694,446	409,989	6,235,672	565,542	16,135,595	81.20	3,743,154	2,971,180	2,236,408	1,521,498
Panhandle & Santa Fe	858	1,050,930	128,698	1,234,376	139,487	207,573	7,116	318,443	18,239	690,602	55.90	543,774	504,753	453,614	217,775
	858	6,059,224	1,102,527	7,566,631	1,289,749	1,921,194	70,027	2,226,664	165,695	5,669,753	74.90	1,896,878	1,657,637	1,280,534	469,611
	93	150,743	71,743	255,427	33,639	43,396	8,322	86,738	10,652	187,997	73.60	67,430	56,022	42,359	29,449
	93	1,210,536	655,588	2,141,199	297,246	401,159	78,576	793,489	98,803	1,710,609	79.80	430,590	323,473	220,822	280,032
Atlanta & West Point	858	1,050,930	128,698	1,234,376	139,487	207,573	7,116	318,443	18,239	690,602	55.90	543,774	504,753	453,614	217,775
	858	6,059,224	1,102,527	7,566,631	1,289,749	1,921,194	70,027	2,226,664	165,695	5,669,753	74.90	1,896,878	1,657,637	1,280,534	469,611
	93	150,743	71,743	255,427	33,639	43,396	8,322	86,738	10,652	187,997	73.60	67,430	56,022	42,359	29,449
	93	1,210,536	655,588	2,141,199	297,246	401,159	78,576	793,489	98,803	1,710,609	79.80	430,590	323,473	220,822	280,032
Western of Alabama	133	192,111	68,987	285,281	36,100	45,340	9,692	75,183	10,269	180,709	63.30	104,572	90,843	83,418	64,000
	133	1,454,999	616,502	2,290,460	295,394	459,929	87,269	703,681	98,476	1,683,510	73.50	666,956	492,655	453,895	436,030
	133	322,591	49,443	403,547	76,117	90,383	24,099	152,726	16,905	360,288	89.30	43,259	30,590	21,979	—3,566
	133	2,866,944	422,804	3,559,789	659,382	772,069	204,324	1,488,356	145,698	3,270,447	91.90	289,342	173,842	67,791	—184,329
Atlanta, Birmingham & Atlantic	639	1,454,999	616,502	2,290,460	295,394	459,929	87,269	703,681	98,476	1,683,510	73.50	666,956	492,655	453,895	436,030
	639	322,591	49,443	403,547	76,117	90,383	24,099	152,726	16,905	360,288	89.30	43,259	30,590	21,979	—3,566
	639	2,866,944	422,804	3,559,789	659,382	772,069	204,324	1,488,356	145,698	3,270,447	91.90	289,342	173,842	67,791	—184,329
Atlantic Coast Line	4,864	4,023,559	1,166,399	5,667,825	971,186	1,317,748	122,495	2,070,951	141,384	4,645,031	82.00	1,022,794	546,725	669,632	64,000	
	4,865	42,562,036	13,617,227	60,993,066	7,908,363	12,487,919	1,121,900	21,768,288	1,369,201	44,964,615	73.50	16,028,451	12,089,570	11,551,279	436,030	
	342	269,968	30,991	314,802	43,967	42,967	7,307	122,048	7,064	223,353	70.90	91,449	73,904	66,705	—3,566	
	342	2,467,060	284,855	2,884,108	569,619	447,227	65,277	1,178,390	62,023	2,322,536	80.50	561,572	403,276	318,304	—184,329	
Charleston & Western Carolina	4,864	4,023,559	1,166,399	5,667,825	971,186	1,317,748	122,495	2,070,951	141,384	4,645,031	82.00	1,022,794	546,725	669,632	64,000	
	4,865	42,562,036	13,617,227	60,993,066	7,908,363	12,487,919	1,121,900	21,768,288	1,369,201	44,964,615	73.50	16,028,451	12,089,570	11,551,279	436,030	
	342	269,968	30,991	314,802	43,967	42,967	7,307	122,048	7,064	223,353	70.90	91,449	73,904	66,705	—3,566	
	342	2,467,060	284,855	2,884,108	569,619	447,227	65,277	1,178,390	62,023	2,322,536	80.50	561,572	403,276	318,304	—184,329	
Baltimore & Ohio	5,303	15,551,689	2,546,968	19,355,865	2,075,029	3,995,760	333,998	6,819,997	507,991	13,892,774	71.80	5,463,091	4,647,743	4,268,449	3,977,152	
	5,303	132,723,299	22,232,714	166,061,292	20,490,535	35,252,949	3,222,798	63,452,314	4,664,222	128,341,890	77.30	37,719,393	30,101,870	27,728,017	34,932,894	
	80	.....	.....	309,371	39,055	47,597	2,053	160,884	9,680	262,720	84.90	46,651	5,051	106,367	85,519	
	80	.....	.....	2,657,915	473,951	441,667	17,155	1,545,385	84,574	2,596,696	97.70	61,225	—299,905	168,337	352,137	
Baltimore & Ohio Chicago Term	5,303	15,551,689	2,546,968	19,355,865	2,075,029	3,995,760	333,998	6,819,997	507,991	13,892,774	71.80	5,463,091	4,647,743	4,268,449	3,977,152	
	5,303	132,723,299	22,232,714	166,061,292	20,490,535	35,252,949	3,222,798	63,452,314	4,664,222	128,341,890	77.30	37,719,393	30,101,870	27,728,017	34,932,894	
	80	.....	.....	309,371	39,055	47,597	2,053	160,884	9,680	262,720	84.90	46,651	5,051	106,367	85,519	
	80	.....	.....	2,657,915	473,951	441,667	17,155	1,545,385	84,574	2,596,696	97.70	61,225	—299,905	168,337	352,137	
Staten Island Rapid Transit	23	90,279	116,014	239,987	93,568	30,695	1,914	122,952	14,498	263,627	109.90	—23,640	—39,682	—52,354	—21,535	
	23	815,174	1,025,090	2,093,410	489,081	293,890	18,965	1,095,506	135,990	2,033,432	97.10	59,978	—83,444	—199,585	—154,938	
	616	432,708	58,080	516,395	97,446	113,745	3,843	151,116	21,066	389,472	75.40	126,923	81,459	128,457	136,362	
	616	4,176,404	600,970	4,990,215	931,004	1,162,953	39,090	1,465,813	179,187	3,795,181	76.10	1,195,034	824,666	1,163,385	1,007,739	
Bessemer & Lake Erie	32	.....	.....	617,392	45,890	57,372	3,141	258,463	9,507	374,373	60.60	243,019	197,669	157,731	199,599	
	32	.....	.....	5,049,143	465,446	492,199	25,429	2,316,804	90,987	3,390,865	67.20	1,658,278	1,271,826	1,296,425	1,438,051	
	228	1,394,008	27,881	1,445,888	110,749	425,367	15,601	353,957	3,878	899,287	62.20	546,601	233,918	235,889	687,798	
	228	11,072,714	234,265	11,511,985	1,273,860	4,101,282	137,258	3,209,244	269,543	8,907,633	77.40	2,604,352	1,911,506	2,223,799	5,988,818	
Bingham & Garfield	253	107,268	.....	113,266	8,513	17,216	40	41,490	5,423	72,712	64.20	40,554	33,982	34,982	29,120	
	253	992,402	.....	1,054,581	74,428	125,300	3,034	394,558	47,218	644,536	61.10	410,043	345,662	356,102	416,045	
	253	138,547	3,528	145,696	33,132	54,719	1,894	44,310	9,061	143,116	98.30	2,580	—2,920	20,328	25,883	
	253	1,296,820	44,662	1,375,060	309,960	600,438	17,592	446,159	81,982	1,456,131	105.90	—81,071	—123,375	116,674	551,220	
Boston & Maine	33	36,659	.....	37,855	13,617	17,216	40	41,490	5,423	72,712	64.20	40,554	33,982	34,982	29,120	
	34	344,635	.....	357,417	87,025	125,300	3,034	394,558	47,218	644,536	61.10	410,043	345,662	356,102	416,045	
	2,287	3,985,995	12	4,134,041	842,819	1,386,024	57,672	2,620,450	225,005	5,155,182	76.60	1,578,859	—24,265	2,915	—6,771	
	2,287	34,913,804	16,442,182	58,371,641	7,469,120	12,180,410	510,729	25,544,972	2,063,822	47,967,195	82.20	10,404,446	8,136,128	1,320,786	1,072,747	115,879
Brooklyn Eastern District Terminal	9	107,268	.....	113,266	8,513	17,216	40	41,490	5,423	72,712	64.20	40,554	33,982	34,982	29,120	
	9	992,402	.....	1,054,581	74,428	125,300	3,034	394,558	47,218	644,536	61.10	410,043	345,662	356,102	416,045	
	253	138,547	3,528	145,696	33,132	54,719	1,894	44,310	9,061	143,116	98.30	2,580	—2,920	20,328	25,883	
	253	1,296,820	44,662	1,375,060	309,960	600,438	17,592	446,159	81,982	1,456,131	105.90	—81,071	—123,375	116,674	551,220	
Buffalo & Susquehanna R. R. Corp	9	107,268	.....	113,266	8,513	17,216	40	41,490	5,423	72,712	64.20	40,554	33,982	34,982	29,120	
	9	992,402	.....	1,054,581	74,428	125,300	3,034	394,558	47,218	644,536	61.10	410,043	345,662	356,102	416,045	
	253	138,547	3,528	145,696	33,132	54,719	1,894	44,310	9,061	143,116	98.30	2,580	—2,920	20,328	25,883	
	253	1,296,820	44,662	1,375,060	309,960	600,438	17,592	446,159	81,982	1,456,131	105.90	—81,071	—123,375	116,674	551,220	
Buffalo, Rochester & Pittsburgh	591	1,208,860	127,237	1,399,590	176,004	367,857	23,731	515,993	39,160	1,125,079	80.40	274,511	244,490	280,416	193,727	
	591	10,148,142	1,264,714	11,976,355	1,240,172	3,681,636	228,914	4,746,960	368,139	10,280,309	85.80	1,696,046	1,410,282	1,786,802	2,341,127	
	233	87,700	26,833	127,447	46,377	24,545	4,878	63,637	3,487	142,924	112.10	—15,477	—26,477	—37,832	—73,156	
	233	1,469,422	313,582	1,918,583	581,270	394,431	42,870	865,556	32,333	1,916,460	99.90	2,123	—96,877	—214,439	—157,440	
Canadian Pacific, Lines in Maine	591	1,208,860	127,237	1,399,590	176,004	367,857	23,731	515,993	39,160	1,125,079	80.40	274,511	244,490	280,416	193,727	
	591	10,148,142	1,264,714	11,976,355	1,240,172	3,681,636	228,914	4,746,960	368,139	10,280,309	85.80	1,696,046	1,410,282	1,786,802	2,341,127	
	233	87,700	26,833	127,447	46,377	24,545	4,878	63,637	3,487	142,924	112.10	—15,477	—26,477	—37,832	—73,156	
	233	1,469,422	313,582	1,918,583	581,270	394,431	42,870	865,556	32,333	1,916,460	99.90	2,123	—96,877	—214,439	—157,440	
Carolina, Clinchfield & Ohio	309	694,352	37,531	746,290	116,501	192,757	25,156	163,217	18,767	515,928	69.10	230,362	180,316	251,561	202,951	
	309	5,866,870	345,283	6,342,997	778,396	1,534,919	234,422	1,633,962	178,247	4,356,653	68.70	1,986,344	1,535,999	1,913,392	2,079,310	
	1,920	1,671,761	413,986	2,265,391	374,489	393,146	63,252	794,854	86,193	1,701,002	75.10	564,389	449,366	447,198	269,203	
	1,920	14,095,292	4,060,524	19,907,510	3,120,973	3,588,374	617,861	7,548,597	802,449	15,662,765	78.70	4,244,745	3,302,653	3,184,812	2,995,849	
Central of New Jersey	691	3,793,523	897,650	4,986,338	516,133	276,265	44,713	1,793,974	104,745	2,815,373	56.50	2,170,965	1,702,038	1,614,401	—190,708	
	692	31,627,044	7,502,386	41,632,733	4,487,355	8,486,160	337,332	16,440,166	970,348	30,892,037	74.20	10,740,696	7,336,599	6,547,825	4,017,213	
	434	495,300	143,000	709,390	106,198	112,355	17,528	288,802	21,629	542,463	76.50	166,927	—2,920	118,016	92,568	
	434	4,865,142	982,361	6,490,168	1,232,139	1,073,516	124,695	2,944,915	211,990	5,612,103	86.50	878,065	707,181	439,872	38,641	
Central Vermont	691	3,793,523	897,650	4,986,338	516,133	276,265	44,713	1,793,974	104,745	2,815,373	56.50	2,170,965	1,702,038	1,614,401	—190,708	
	692	31,627,044	7,502,386	41,632,733	4,487,355	8,486,160	337,332	16,440,166	970,348	30,892,037	74.20	10,740,696	7,336,599	6,547,825	4,017,213	
	434	495,300	143,000	709,390	106,198	112,355	17,528	288,802	21,629	542,463	76.50	166,927	—2,920	118,016	92,568	
	434	4,865,142	982,361	6,490,168	1,232,139	1,073,516	124,695	2,944,915	211,990	5,612,103	86.50	878,065	707,181	439,872	38,641	
Chesapeake & Ohio	2,555	8,231,346	981,076	9,649,875	1,523,621	3,014,017	93,962	2,662,702	205,437	7,520,860	77.90	2,129,015	1,735,291	1,833,585	1,744,371	
	2,555	67,387,900	8,327,639	79,393,720	11,267,381	21,823,783	874,560	24,305,165	1,880,416	60,410,473	76.10	18,983,247	15,559,251	16,709,595	15,261,793	
	1,050	2,016,333	561,875	2,803,470	406,934	599,845	73,993	940,732	54,775	2,091,644	74.60	711,826	613,564	524,709	677,808	
	1,050	15,876,676	4,906,957	22,819,346	3,063,508	5,288,275	562,811	8,320,345	533,929	17,667,910	77.40	5,151,636	4,293,081	3,377,018	4,059,707	
Chicago & Alton																

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF SEPTEMBER AND NINE MONTHS OF CALENDAR YEAR 1924—CONTINUED

Name of road		Average mileage operated during period.	Operating revenues: Freight.	Passenger.	Total (inc. misc.)	Operating expenses: Maintenance of Way and structures.	Maintenance of Equipment.	Traffic.	Transportation.	General.	Total.	Operating ratio.	Net from railway operation.	Operating income (or loss).	Net after rents.	Net after rents, 1923.
Chicago & Eastern Illinois	Sept.	945	$1,749,237	$377,711	$2,288,567	$211,965	$649,122	$51,922	$807,399	$62,606	$1,796,053	78.50	$92,514	$361,314	$337,768	$318,752
	9 mos.	945	14,086,589	3,589,321	19,171,980	2,027,215	5,743,944	457,143	7,789,792	607,752	16,751,690	87.40	2,420,290	1,371,970	823,740	2,425,825
Chicago & North Western	Sept.	8,462	10,735,115	2,368,365	14,631,856	2,387,346	2,596,640	178,204	5,102,711	337,403	10,665,150	72.90	3,966,706	3,165,118	2,693,823	1,980,028
	9 mos.	8,462	76,640,660	22,397,228	111,426,279	16,891,579	23,440,244	1,509,775	45,653,100	3,108,213	91,180,678	81.80	20,245,601	13,389,958	11,699,028	10,453,732
Chicago, Burlington & Quincy	Sept.	9,417	11,951,771	2,402,840	15,717,314	2,170,761	3,118,536	221,130	4,889,126	352,554	10,841,590	69.00	4,875,724	3,995,474	3,649,631	2,882,359
	9 mos.	9,407	86,885,776	20,336,531	119,121,618	14,359,544	25,342,525	2,165,678	42,780,485	3,184,886	88,575,314	74.40	30,546,304	22,647,600	20,317,615	16,524,284
Chicago Great Western	Sept.	1,496	1,799,808	343,427	2,335,001	381,791	410,040	66,849	845,499	52,297	1,770,839	75.80	564,162	485,603	353,053	156,668
	9 mos.	1,496	13,657,064	2,995,523	18,138,724	2,808,531	3,610,175	603,241	7,572,893	484,169	15,183,145	83.70	2,955,579	2,271,413	1,378,181	1,076,692
Chicago, Indianapolis & Louisville	Sept.	654	1,110,618	257,898	1,509,591	167,173	326,801	34,094	507,414	32,657	1,078,380	71.40	431,211	344,081	218,595	239,657
	9 mos.	654	9,153,924	2,299,836	12,689,632	1,343,932	2,648,196	300,125	4,543,186	309,181	9,273,085	73.10	3,416,547	2,723,924	1,581,884	1,700,339
Chicago, Milwaukee & St. Paul	Sept.	10,986	11,859,935	1,813,005	15,127,381	2,181,575	2,853,363	210,496	5,197,965	307,256	10,824,801	71.60	4,302,580	3,599,200	3,024,940	2,664,107
	9 mos.	10,986	86,243,059	16,865,460	115,353,595	17,709,697	25,743,891	1,831,594	45,852,814	2,937,856	94,666,528	82.10	20,687,067	13,679,332	10,324,216	12,602,078
Chicago, Peoria & St. Louis	Sept.	247	102,814	9,857	123,894	19,325	18,039	1,650	54,214	7,576	100,804	81.40	23,090	18,219	—1,458	4,054
	9 mos.	247	742,439	113,805	946,838	167,609	157,622	15,734	494,154	72,684	907,803	95.90	39,035	5,709	—182,517	—176,213
Chicago River & Indiana	Sept.	19	.....	.....	570,837	80,559	73,716	663	214,248	12,082	381,268	66.80	189,569	154,183	259,482	258,322
	9 mos.	19	.....	.....	5,131,382	667,182	597,252	7,856	2,044,924	105,512	3,422,726	66.70	1,708,656	1,381,701	2,307,764	2,461,046
Chicago, Rock Island & Pacific	Sept.	7,594	8,865,647	2,204,661	11,883,883	1,306,141	2,334,370	197,461	4,029,643	273,444	8,193,729	69.00	3,690,154	3,126,888	2,682,183	2,028,420
	9 mos.	7,617	65,619,631	18,979,799	91,215,129	10,634,220	20,361,754	1,860,117	36,952,006	2,596,234	72,526,505	79.50	18,688,624	13,846,224	9,887,829	9,119,364
Chicago, Rock Island & Gulf	Sept.	461	462,500	76,872	584,395	86,961	63,062	14,528	195,847	15,855	378,745	64.80	205,650	193,147	157,311	88,985
	9 mos.	461	3,685,970	691,911	4,746,080	695,889	618,963	128,685	1,884,114	146,203	3,493,323	73.60	1,252,757	1,139,674	802,823	316,635
Chic., St. Paul, Minn. & Omaha	Sept.	1,749	2,184,097	490,010	2,878,050	403,823	420,567	29,790	1,045,431	76,712	1,987,652	69.10	890,398	712,091	601,103	333,357
	9 mos.	1,749	14,506,414	4,463,843	20,564,648	2,962,089	3,853,518	307,261	8,920,438	655,441	16,765,915	81.50	3,798,733	2,623,032	2,115,402	1,849,418
Cincinnati, Indianapolis & Western	Sept.	347	351,483	33,277	409,411	61,416	98,857	14,559	153,284	17,005	345,918	84.50	63,493	44,997	24,154	46,281
	9 mos.	347	2,780,197	291,499	3,276,567	461,753	709,656	124,066	1,328,930	159,875	2,790,188	85.10	486,379	323,421	144,001	238,205
Colorado & Southern	Sept.	1,094	830,016	193,226	1,116,414	138,731	213,675	11,360	390,877	41,585	805,678	72.20	310,736	248,077	228,951	102,496
	9 mos.	1,098	7,036,576	1,459,285	9,359,983	1,276,149	2,168,544	127,135	3,585,926	388,343	7,621,538	82.30	1,638,445	1,073,297	1,011,478	267,480
Ft. Worth & Denver City	Sept.	456	708,252	219,048	981,837	80,924	146,920	12,711	238,169	36,808	523,309	53.30	458,528	406,873	398,617	197,729
	9 mos.	456	5,508,212	1,514,156	7,461,046	740,074	1,530,484	133,188	2,142,358	316,063	4,893,171	65.60	2,567,875	2,196,237	2,244,391	1,762,583
Wichita Valley	Sept.	271	107,904	32,565	149,876	13,662	8,576	2	42,682	1,732	65,781	43.90	84,095	73,373	52,743	24,886
	9 mos.	271	969,348	217,706	1,261,696	195,069	93,888	215	378,883	17,499	678,102	53.70	583,594	511,901	347,967	176,915
Columbus & Greenville	Sept.	167	110,284	29,266	147,929	38,750	23,157	2,558	54,708	10,139	129,097	87.30	18,832	17,308	679	7,372
	9 mos.	167	861,079	241,731	1,167,635	345,740	155,933	24,262	418,618	85,680	1,027,961	88.00	139,674	126,569	28,767	—19,527
Delaware & Hudson	Sept.	894	3,247,337	537,712	4,006,813	394,091	929,241	51,301	1,291,125	136,034	2,822,661	70.40	1,184,152	1,080,498	1,130,066	348,070
	9 mos.	894	28,756,134	3,087,726	33,720,840	4,085,833	8,885,328	426,458	12,621,180	1,249,973	27,460,285	81.40	6,260,555	5,329,571	5,636,569	4,935,238
Delaware, Lackawanna & Western	Sept.	992	5,251,449	1,268,699	7,331,638	738,125	1,509,932	114,484	2,699,261	158,972	5,272,326	71.90	2,059,312	1,479,121	1,513,997	666,944
	9 mos.	992	46,625,529	10,353,228	64,213,204	6,066,178	13,879,261	1,055,837	25,398,173	1,440,216	48,308,643	75.20	15,904,561	10,966,700	11,462,826	9,426,312
Denver & Rio Grande Western	Sept.	2,609	2,636,457	541,143	3,459,364	680,263	828,266	49,969	1,078,532	86,434	2,723,439	78.70	735,925	580,079	569,178	395,460
	9 mos.	2,603	17,546,053	4,076,959	23,683,886	4,664,706	6,453,503	461,139	7,856,009	763,965	20,439,720	86.30	3,244,166	1,759,047	2,214,388	1,443,006
Denver & Salt Lake	Sept.	255	290,324	25,635	346,010	92,803	89,296	1,323	94,602	6,664	284,688	82.30	61,322	52,322	50,929	24,305
	9 mos.	255	1,764,404	252,464	2,239,577	700,355	818,569	12,004	682,900	59,009	2,272,837	101.50	—33,260	—114,269	—65,669	—25,017
Detroit & Mackinac	Sept.	375	128,130	20,413	166,478	31,202	40,366	2,063	56,223	6,694	136,286	81.90	30,192	20,028	24,662	5,113
	9 mos.	375	1,083,743	236,629	1,452,466	271,414	342,912	18,545	533,059	57,674	1,219,977	84.00	232,489	135,706	200,750	37,177
Detroit & Toledo Shore Line	Sept.	61	270,429	.....	274,072	26,571	22,674	2,699	77,863	7,639	137,446	50.10	136,626	114,433	43,925	29,125
	9 mos.	61	2,448,944	.....	2,482,404	293,866	256,972	25,896	805,900	66,247	1,448,881	58.40	1,033,523	829,528	156,572	584,102
Detroit Terminal	Sept.	18	.....	.....	186,573	22,186	10,805	.....	93,655	2,742	129,388	69.35	57,185	35,443	49,970	61,652
	9 mos.	18	.....	.....	1,757,130	261,820	105,028	94	886,206	16,590	1,269,738	72.26	487,392	308,540	427,398	399,865
Detroit, Toledo & Ironton	Sept.	468	1,017,554	8,163	1,055,732	175,213	201,648	9,031	285,973	23,426	693,519	65.70	362,213	327,263	205,551	211,227
	9 mos.	468	8,668,893	77,627	8,914,969	1,310,677	1,465,974	64,441	2,503,061	224,791	5,552,556	62.30	3,362,413	3,055,979	2,021,744	1,506,950
Duluth & Iron Range	Sept.	275	641,716	7,799	711,232	81,883	102,685	1,141	188,151	18,743	393,069	55.30	318,163	—166,115	—165,630	400,906
	9 mos.	280	4,475,757	111,758	5,017,931	945,495	1,125,169	10,573	1,585,643	185,695	3,851,453	76.80	1,166,478	398,807	398,817	1,715,489
Duluth, Missabe & Northern	Sept.	304	2,003,388	8,323	2,154,589	144,868	163,669	3,401	334,329	22,286	669,256	31.10	1,485,333	265,710	254,339	2,253,006
	9 mos.	305	10,927,724	98,530	11,833,536	1,584,517	1,750,711	28,310	2,346,783	183,229	5,899,816	49.90	5,933,720	3,588,772	3,540,195	8,576,749
Duluth, South Shore & Atlantic	Sept.	591	397,929	93,182	549,044	110,133	78,868	6,652	213,849	13,383	428,286	78.00	120,758	88,758	53,708	132,151
	9 mos.	591	3,301,899	865,212	4,569,424	811,916	721,496	56,346	1,932,437	101,375	3,673,799	80.40	895,625	612,522	379,784	475,162
Duluth, Winnipeg & Pacific	Sept.	178	141,915	18,736	168,136	34,783	42,343	3,980	61,164	7,638	150,993	89.80	17,143	8,849	30,942	—32,089
	9 mos.	178	1,427,630	170,531	1,650,953	317,614	315,995	30,656	671,131	83,264	1,428,820	86.50	222,133	139,356	180,580	54,668
Elgin, Joliet & Eastern	Sept.	459	1,502,213	18	1,630,439	167,415	284,290	12,111	552,641	39,326	1,055,467	64.70	574,972	429,416	306,260	239,307
	9 mos.	459	14,488,367	480	15,933,068	1,736,995	3,655,293	110,617	5,711,660	367,138	11,579,178	72.70	4,353,890	3,551,922	2,188,358	4,811,911
El Paso & Southwestern	Sept.	1,139	781,921	121,035	974,762	148,299	157,350	33,143	217,582	40,941	612,270	62.80	362,492	273,380	249,070	150,276
	9 mos.	1,139	7,317,227	1,499,034	9,323,169	1,591,227	1,791,648	327,540	2,588,766	380,462	6,768,298	72.60	2,554,871	1,754,369	1,306,712	1,387,776

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF SEPTEMBER AND NINE MONTHS OF CALENDAR YEAR 1924—CONTINUED

Name of road		Average mileage operated during period.	Operating revenues: Freight.	Passenger.	Total (inc. misc.)	Operating expenses: Maintenance of: Way and structures.	Equipment.	Traffic.	Transportation.	General.	Total.	Operating ratio.	Net from railway operation.	Operating income (or loss).	Net after rents.	Net after rents, 1923.
Erie R. R.	Sept.	2,055	$7,879,002	$1,106,606	$9,690,744	$1,114,427	$2,394,774	$153,151	$3,422,592	$283,585	$7,418,706	76.60	$2,272,038	$1,927,238	$2,008,237	$1,194,315
	9 mos.	2,055	62,163,012	10,088,436	78,582,678	9,794,583	21,189,670	1,303,540	30,523,137	2,556,169	65,736,558	83.70	12,846,120	9,719,594	11,172,167	12,792,203
Chicago & Erie	Sept.	269	1,131,619	71,654	1,295,158	157,341	146,164	23,394	394,630	36,931	757,966	58.50	537,192	484,508	191,324	293,734
	9 mos.	269	8,964,913	592,222	10,393,809	1,155,265	1,355,709	202,366	3,597,424	330,336	6,637,667	63.90	3,756,142	3,281,702	736,881	—138,648
New Jersey & New York	Sept.	45	22,219	106,615	133,968	21,251	21,671	1,348	61,281	3,429	108,979	81.30	24,989	21,314	—8,923	5,549
	9 mos.	45	208,028	940,160	1,193,589	178,114	181,156	11,504	573,456	32,384	976,582	81.80	217,007	183,802	—77,791	—85,946
N. Y., Susquehanna & Western	Sept.	135	321,464	59,714	428,211	84,821	82,690	3,794	184,492	10,356	366,150	85.50	62,061	33,500	21,753	—77,119
	9 mos	135	2,583,941	540,878	3,527,132	562,129	741,688	33,270	1,818,810	98,037	3,253,829	92.30	273,303	4,825	—113,374	—1,809
Evansville, Ind. & Terre Haute	Sept.	143	189,177	4,293	201,189	29,472	16,494	1,762	62,464	3,564	113,756	56.50	87,433	82,072	50,936	4,861
	9 mos.	141	1,224,359	53,623	1,333,912	307,835	136,210	16,836	520,884	30,582	997,238	74.80	336,674	292,876	80,859	—54,627
Florida East Coast	Sept.	763	902,814	306,912	1,358,030	251,577	226,594	10,908	420,568	36,375	942,103	69.40	415,927	310,376	236,301	—126,075
	9 mos.	763	8,568,691	4,328,793	14,597,204	2,050,067	2,310,611	142,765	4,733,405	311,673	9,647,660	66.10	4,949,544	4,044,614	3,234,359	2,825,091
Fort Smith & Western	Sept.	249	146,987	21,105	176,880	22,704	31,207	5,018	45,819	7,668	113,042	63.90	63,838	58,038	43,338	1,345
	9 mos.	249	1,033,449	174,443	1,288,320	252,295	243,083	46,651	441,560	69,220	1,049,699	81.40	238,621	185,118	51,923	54,490
Galveston Wharf Co.	Sept.	13	.....	.....	209,737	64,093	3,320	842	44,500	2,488	138,485	66.00	71,252	51,252	51,309	40,017
	9 mos.	13	.....	.....	994,330	384,601	34,743	7,986	263,971	23,990	780,267	78.50	214,063	52,778	52,902	105,912
Georgia R. R.	Sept.	328	373,638	94,737	502,648	68,313	101,750	21,484	193,749	20,527	405,962	80.80	96,686	89,936	82,512	97,848
	9 mos.	328	3,256,937	883,224	4,441,006	516,792	869,875	198,640	1,961,033	188,640	3,719,591	83.80	721,415	658,822	570,396	806,163
Georgia & Florida	Sept.	406	126,235	21,368	155,066	20,488	21,790	9,019	53,404	8,523	113,456	73.20	41,610	34,975	19,954	19,184
	9 mos.	406	1,079,498	170,130	1,326,051	161,220	183,854	76,726	496,443	73,615	993,906	75.00	332,145	273,437	154,861	154,725
Grand Trunk Western	Sept.	347	1,274,175	210,626	1,571,417	161,675	321,059	45,349	552,894	47,764	1,138,675	72.50	432,742	352,874	225,822	219,698
	9 mos.	347	11,216,486	1,766,228	13,800,251	1,617,411	3,582,364	408,794	5,391,509	448,244	11,523,862	83.50	2,276,389	1,596,272	98,525	1,682,107
Atlantic & Saint Lawrence	Sept.	166	119,661	48,761	180,745	65,176	47,493	7,412	100,761	8,218	230,386	127.40	—49,641	—68,418	—123,031	—106,328
	9 mos.	166	1,313,376	320,922	1,767,102	517,314	374,717	55,680	1,045,575	82,860	2,089,923	118.30	—322,821	—470,553	—1,013,729	—1,418,437
Chic., Detroit & Can. Gr. Tr. Jct.	Sept.	59	166,543	8,647	210,620	27,857	5,406	5,664	74,007	3,313	116,245	55.20	94,375	80,248	63,142	86,564
	9 mos.	59	1,770,883	76,123	2,162,351	258,097	87,580	53,622	745,811	30,059	1,175,138	54.30	987,213	883,313	651,103	1,084,219
Detroit, Gr. Haven & Milwaukee	Sept.	189	484,693	45,763	576,385	96,985	24,409	13,744	260,901	15,363	411,994	71.50	164,391	158,852	71,356	78,859
	9 mos.	189	4,071,688	357,838	4,839,468	867,466	378,464	126,878	2,189,347	136,320	3,701,208	76.50	1,138,260	1,090,041	286,641	428,385
Great Northern	Sept.	8,251	9,113,238	1,245,691	11,304,197	1,328,673	1,574,751	157,987	3,635,990	209,936	6,947,691	61.50	4,356,506	3,439,699	3,082,268	3,508,200
	9 mos.	8,251	57,065,682	10,132,684	75,027,928	10,976,951	12,888,391	1,560,975	27,972,032	1,951,031	55,619,974	74.10	19,407,954	12,105,771	12,407,460	13,275,167
Green Bay & Western	Sept.	234	103,973	8,849	120,078	31,203	21,488	3,936	39,508	3,035	99,170	82.50	20,908	13,400	8,500	—4,369
	9 mos.	234	900,105	121,374	1,086,336	206,640	192,804	31,126	396,048	22,964	849,427	78.10	236,909	169,374	125,674	87,979
Gulf Coast Lines	Sept.	922	947,648	180,401	1,247,825	223,792	170,470	29,521	288,246	39,611	749,885	60.10	497,940	432,921	366,341	411,368
	9 mos.	922	8,520,064	1,609,386	10,796,154	1,713,652	1,374,147	265,531	2,666,170	384,583	6,378,438	59.08	4,417,716	3,887,441	3,376,967	2,549,408
Gulf & Ship Island	Sept.	307	264,032	37,682	340,038	91,648	38,079	7,133	80,087	14,306	240,437	70.70	99,601	72,737	66,096	30,962
	9 mos.	307	2,009,164	344,204	2,659,928	468,845	373,079	71,571	756,591	122,555	1,880,716	70.70	779,212	546,885	474,805	340,237
Gulf, Mobile & Northern	Sept.	465	463,447	35,786	516,353	86,539	93,654	22,533	145,584	19,776	368,086	71.29	148,267	119,822	105,839	100,878
	9 mos.	465	3,894,190	344,721	4,411,626	705,520	706,796	192,918	1,379,371	183,227	3,164,937	71.74	1,246,689	992,280	883,871	750,613
Hocking Valley	Sept.	348	1,390,855	71,376	1,618,662	194,958	564,374	14,414	465,859	35,799	1,275,009	78.80	343,653	252,528	290,588	99,002
	9 mos.	348	11,181,506	689,308	12,993,062	1,398,206	3,907,175	124,876	3,910,504	327,832	9,667,134	74.40	3,325,928	2,494,020	2,764,623	2,248,569
Illinois Central	Sept.	4,847	10,116,645	1,991,183	13,029,025	1,886,478	3,091,612	204,926	4,280,626	303,020	9,773,478	75.00	3,255,547	2,087,393	2,166,742	1,830,419
	9 mos.	4,847	84,997,707	19,180,329	112,361,443	14,746,210	26,557,702	1,799,055	41,224,995	2,838,731	87,479,189	77.90	24,882,254	17,019,424	18,156,448	17,490,553
Yazoo & Mississippi Valley	Sept.	1,380	1,632,877	292,712	2,035,920	350,559	324,922	23,308	660,966	42,253	1,402,749	68.90	633,171	517,777	492,461	189,599
	9 mos.	1,380	11,903,445	2,726,495	15,487,901	2,441,367	2,759,948	215,547	5,856,431	390,166	11,666,989	75.30	3,820,912	2,781,765	2,646,878	621,334
Illinois Central Combined Report	Sept.	6,227	11,749,522	2,283,895	15,064,945	2,237,037	3,416,534	228,234	4,941,592	345,273	11,176,227	74.20	3,888,718	2,605,170	2,659,203	2,020,018
	9 mos.	6,227	96,901,152	21,906,824	127,849,344	17,187,577	29,317,650	2,014,602	47,081,426	3,228,897	99,146,178	77.50	28,703,166	19,801,189	20,803,326	18,111,887
International Great Northern	Sept.	1,159	1,262,509	227,330	1,622,758	251,334	246,687	34,641	507,576	51,221	1,070,497	66.00	552,261	517,043	435,213	319,837
	9 mos.	1,159	8,773,212	1,933,306	11,869,379	2,293,625	2,247,603	315,779	4,464,995	450,933	9,528,060	81.10	2,241,319	1,925,145	1,433,523	1,222,828
Kansas City, Mexico & Orient	Sept.	272	195,786	10,542	216,141	40,461	49,275	6,824	78,779	5,588	180,927	83.70	35,214	25,214	—3,650	—9,803
	9 mos.	272	1,477,106	76,791	1,619,647	320,252	362,774	50,303	656,203	52,438	1,441,925	89.00	177,722	108,684	—50,143	—3,804
Kans. City, Mex. & Orient of Tex.	Sept.	465	244,781	13,502	266,766	79,841	35,948	7,365	75,507	6,070	204,370	76.60	62,396	55,509	39,006	—6,507
	9 mos.	465	1,573,098	102,441	1,734,565	417,388	301,336	54,137	635,534	54,858	1,462,243	84.30	272,322	224,367	89,128	—206,778
Kansas City Southern	Sept.	767	1,260,792	152,230	1,576,783	231,476	312,409	42,998	502,654	81,483	1,171,746	74.30	405,037	321,206	327,844	221,734
	9 mos.	767	10,747,743	1,453,122	13,451,625	2,008,303	2,612,228	376,211	4,528,196	682,647	10,198,778	75.80	3,252,847	2,460,340	2,186,200	2,378,992
Texarkana & Ft. Smith	Sept.	81	225,061	12,754	260,096	18,877	31,057	4,806	64,488	9,494	132,262	50.90	127,834	112,422	83,030	141,572
	9 mos.	81	1,854,563	126,538	2,149,556	185,940	193,944	45,991	565,770	86,872	1,095,003	50.90	1,054,553	915,319	695,840	710,069
Kansas, Oklahoma & Gulf	Sept.	314	186,031	9,293	201,399	53,662	28,715	8,700	67,517	9,226	167,876	83.40	33,523	23,292	17,420	7,659
	9 mos.	314	1,414,125	87,457	1,554,333	380,003	258,157	73,160	607,744	98,720	1,418,180	91.20	136,153	44,628	—15,111	100,717
Lake Superior & Ishpeming	Sept.	162	178,662	2,505	206,435	43,866	26,081	706	50,791	4,846	126,290	61.20	80,145	66,160	65,629	72,477
	9 mos.	162	1,206,566	41,692	1,400,786	352,030	211,112	5,004	414,380	48,036	1,030,562	73.60	370,224	251,777	230,132	471,674

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF SEPTEMBER AND NINE MONTHS OF CALENDAR YEAR 1924—CONTINUED

Name of road		Average mileage operated during period.	Operating revenues			Operating expenses						Operating ratio.	Net from railway operation.	Operating income (or loss).	Net after rents.	Net after rents, 1923.
						Maintenance of—										
			Freight.	Passenger.	Total (inc. misc.)	Way and structures.	Equipment.	Traffic.	Transportation.	General.	Total.					
Lake Terminal	Sept.	13	.....	.....	$93,382	$19,433	$17,681	.....	$53,404	$1,776	$92,294	98.80	$1,088	—$5,357	$64	$969
	9 mos.	13	.....	.....	805,248	160,744	157,960	.....	505,620	16,347	840,671	104.40	—35,423	—93,105	—90,939	33,474
Lehigh & Hudson River	Sept.	96	$265,455	$3,070	278,013	37,912	37,215	$1,644	96,894	9,210	182,875	65.80	95,138	81,212	53,711	18,045
	9 mos.	96	2,258,235	28,174	2,379,206	293,845	392,101	15,208	873,933	93,066	1,668,032	70.10	711,174	588,057	370,121	504,863
Lehigh & New England	Sept.	219	495,263	1,507	504,428	72,783	100,945	5,358	144,298	18,074	340,409	67.50	164,019	139,078	144,533	—8,352
	9 mos.	219	3,872,683	14,538	3,961,383	516,906	1,012,001	55,740	1,249,107	170,366	3,001,763	75.80	959,620	801,448	864,642	1,076,079
Lehigh Valley	Sept.	1,374	5,288,860	759,192	6,460,696	789,637	1,490,324	121,552	2,440,689	130,738	5,002,825	77.40	1,457,871	1,139,828	1,083,118	424,136
	9 mos.	1,374	46,959,948	5,865,253	56,709,343	6,189,425	13,799,761	1,041,383	22,651,825	1,216,517	45,143,623	79.60	11,565,720	9,196,246	8,683,935	2,779,441
Los Angeles & Salt Lake	Sept.	1,209	1,442,368	431,827	2,087,087	421,507	408,803	52,759	665,948	64,498	1,690,955	81.00	396,132	268,018	165,937	313,287
	9 mos.	1,209	12,254,884	4,416,005	18,367,448	3,604,073	3,731,388	534,935	5,899,282	557,321	14,938,132	81.30	3,429,316	2,262,840	1,551,810	2,171,337
Louisiana & Arkansas	Sept.	302	313,645	28,160	353,101	54,888	63,721	9,690	90,236	13,757	231,606	65.60	121,495	95,526	81,684	63,530
	9 mos.	302	2,592,616	302,945	3,977,953	524,144	631,010	80,040	841,740	108,847	2,181,643	73.30	796,310	587,423	474,125	629,496
Louisiana Ry. & Nav. Co.	Sept.	337	341,304	22,398	379,478	107,504	48,940	10,797	137,346	9,672	314,041	82.80	65,437	47,429	478	29,136
	9 mos.	337	2,656,407	211,418	3,021,823	760,420	484,177	95,522	1,222,087	96,726	2,651,743	87.70	370,080	207,342	—87,099	53,687
Louisiana Ry. & Nav. Co. of Tex.	Sept.	206	103,976	15,811	126,530	23,548	11,481	1,604	46,427	5,163	88,222	69.70	38,308	34,308	16,988	23,664
	9 mos.	206	782,851	114,670	962,848	184,711	132,313	28,604	448,419	43,873	837,889	87.00	124,959	88,937	—63,344	—24,958
Louisville & Nashville	Sept.	5,042	9,011,932	2,014,786	11,740,878	1,777,635	2,134,472	225,126	3,769,248	255,392	8,162,072	69.50	3,578,806	2,816,651	2,862,732	1,734,427
	9 mos.	5,042	74,874,352	18,188,895	99,257,548	14,710,417	23,647,523	2,036,738	36,883,193	2,311,841	79,826,223	80.40	19,431,325	15,066,472	15,193,898	16,039,164
Louisville, Henderson & St. Louis	Sept.	199	227,919	65,631	313,386	64,131	45,011	7,767	97,723	8,984	223,616	71.40	89,770	69,790	60,486	62,865
	9 mos.	199	1,826,645	533,706	2,547,234	564,708	392,645	63,740	904,997	84,337	2,010,428	78.90	536,806	421,840	337,955	513,865
Maine Central	Sept.	1,207	1,095,860	365,526	1,621,504	286,159	273,215	13,532	692,410	48,619	1,318,622	81.30	302,882	200,646	198,707	199,154
	9 mos.	1,207	10,541,495	3,399,449	15,248,418	2,484,802	2,963,914	127,852	6,470,660	446,371	12,511,012	82.00	2,737,406	1,815,652	1,760,397	1,259,650
Midland Valley	Sept.	365	322,635	44,740	381,189	65,999	44,978	5,759	101,485	16,303	232,866	61.10	148,323	130,023	117,130	89,906
	9 mos.	365	2,709,467	478,076	3,317,307	629,541	457,311	53,845	947,689	153,239	2,217,938	66.90	1,099,369	940,485	813,543	838,198
Minneapolis & St. Louis	Sept.	1,649	1,405,893	115,452	1,592,192	264,725	317,481	27,568	595,036	44,822	1,249,790	78.50	342,402	282,884	202,284	154,729
	9 mos.	1,649	9,244,719	1,094,477	10,969,682	2,524,075	2,892,719	250,670	5,026,322	403,413	11,095,503	101.10	—125,821	—663,297	—1,223,944	766,144
Minneapolis, St. Paul & S. S. Marie	Sept.	4,402	3,837,438	550,132	4,769,536	610,013	769,372	67,290	1,680,761	110,320	3,258,929	68.30	1,510,607	1,226,954	1,056,310	962,605
	9 mos.	4,402	25,185,472	5,095,211	33,331,198	5,339,448	6,468,368	585,395	13,768,226	1,006,251	27,348,411	82.10	5,982,787	3,820,732	3,129,830	5,614,159
Mississippi Central	Sept.	257	148,704	18,344	171,353	24,611	29,049	6,632	42,894	9,718	112,904	65.90	58,449	50,921	52,981	25,058
	9 mos.	257	1,198,330	141,931	1,382,671	253,106	225,459	56,114	382,505	75,533	992,703	71.80	389,968	325,756	367,741	195,330
Missouri & North Arkansas	Sept.	364	115,491	22,982	149,198	27,953	18,102	4,561	52,189	8,011	110,816	74.30	38,382	37,837	26,452	18,004
	9 mos.	364	883,564	182,205	1,146,014	264,006	202,929	40,560	464,758	66,293	1,038,492	90.50	107,522	83,642	14,168	84,544
Missouri-Kansas-Texas	Sept.	1,799	2,598,201	422,983	3,258,882	522,715	728,476	51,651	786,607	93,817	2,192,235	67.30	1,066,647	780,495	778,800	509,795
	9 mos.	1,805	18,677,337	4,027,976	24,559,288	3,057,757	5,684,245	462,026	6,802,340	827,432	16,943,501	69.00	7,615,787	5,842,582	6,136,594	5,970,172
Missouri-Kansas-Texas of Texas	Sept.	1,389	1,710,765	427,824	2,304,385	260,458	394,199	41,620	671,556	63,737	1,442,803	62.60	861,582	812,748	646,455	397,456
	9 mos.	1,389	10,241,979	3,695,756	15,248,401	2,216,376	2,511,566	367,353	5,673,177	601,258	11,437,948	75.00	3,810,453	3,365,999	1,906,452	466,538
Missouri Pacific	Sept.	7,361	8,981,780	1,459,596	11,300,819	1,788,983	2,179,386	212,746	4,086,416	309,433	8,659,381	76.60	2,641,438	2,247,803	1,724,202	790,751
	9 mos.	7,362	68,077,808	13,321,972	88,925,607	13,860,471	18,992,246	1,907,423	33,713,193	2,746,171	71,723,352	80.70	17,202,255	13,785,777	10,738,381	5,671,625
Mobile & Ohio	Sept.	1,165	1,319,986	151,916	1,565,264	239,263	324,542	48,135	513,382	44,553	1,169,304	76.30	395,960	308,696	277,385	167,886
	9 mos.	1,165	12,359,883	1,401,488	14,572,261	2,069,104	2,604,863	428,110	5,073,497	435,346	10,610,446	73.00	3,961,815	3,186,545	2,723,676	2,217,061
Monongahela	Sept.	106	342,540	23,961	370,929	55,000	41,000	1,055	100,737	9,105	206,831	55.80	164,098	153,421	103,016	56,990
	9 mos.	106	3,091,189	253,330	3,385,574	495,000	645,758	9,506	994,058	87,707	2,234,065	66.00	1,151,509	1,056,509	544,486	680,370
Monongahela Connecting	Sept.	7	.....	.....	135,770	25,310	29,434	375	70,105	3,632	128,856	94.90	6,914	2,046	29	35,368
	9 mos.	7	.....	.....	1,472,041	201,796	346,256	3,403	772,459	51,356	1,375,270	93.40	96,771	51,621	—5,247	194,817
Montour	Sept.	57	166,955	671	169,545	40,129	45,486	1,215	35,259	7,325	129,414	76.30	40,131	30,358	66,010	65,022
	9 mos.	57	1,186,749	8,180	1,209,504	258,678	429,119	9,153	308,652	65,726	1,071,328	88.50	138,576	77,152	378,623	763,182
Nashville, Chattanooga & St. Louis	Sept.	1,259	1,380,513	401,019	1,930,809	322,465	418,569	69,986	677,694	65,617	1,557,242	80.70	373,567	322,996	337,761	176,707
	9 mos.	1,258	12,659,309	3,660,992	17,579,995	2,681,125	4,061,229	676,037	6,653,214	606,881	14,706,079	83.70	2,873,916	2,350,751	2,331,716	2,448,245
Nevada Northern	Sept.	165	80,144	9,906	97,389	20,744	6,629	973	16,000	5,028	49,374	50.70	48,015	42,641	42,147	49,749
	9 mos.	165	668,752	88,286	807,728	135,831	71,754	8,282	145,728	41,324	402,919	49.80	404,809	346,200	343,255	342,983
Newburgh & South Shore	Sept.	7	.....	.....	178,212	35,009	32,288	.....	65,949	3,665	136,911	76.80	41,301	27,449	35,148	14,893
	9 mos.	7	.....	.....	1,507,737	247,353	435,536	.....	605,453	35,970	1,328,982	88.10	178,755	57,091	98,806	85,631
New Orleans Great Northern	Sept.	274	204,296	30,659	242,704	37,280	42,305	5,289	76,194	11,588	172,595	71.10	70,109	51,420	41,483	49,588
	9 mos.	274	1,847,593	282,638	2,210,882	342,363	374,255	49,379	690,204	100,662	1,560,834	70.60	650,048	489,317	391,705	543,383
New York Central	Sept.	6,889	19,699,577	8,775,898	32,426,480	4,389,896	6,760,139	368,226	10,654,109	893,657	23,479,965	72.40	8,946,515	6,848,690	6,783,612	5,820,125
	9 mos.	6,889	167,742,798	73,454,325	275,567,861	34,000,455	57,946,860	3,213,536	100,750,035	8,078,327	207,305,870	75.20	68,261,991	50,401,527	48,307,412	60,535,039
Cincinnati Northern	Sept.	244	443,206	11,127	464,435	50,844	71,492	6,447	125,777	8,442	263,002	56.60	201,433	169,613	146,047	—14,048
	9 mos.	244	3,390,827	107,578	3,570,859	489,301	596,499	50,740	1,194,834	78,831	2,407,620	67.40	1,163,239	973,953	615,513	609,449
Cleve., Cin., Chicago & St. Louis	Sept.	2,411	6,098,396	1,408,952	8,158,352	975,220	1,606,807	121,090	2,564,164	184,272	5,510,127	67.50	2,648,225	2,119,177	2,105,213	910,369
	9 mos.	2,410	46,898,203	12,642,899	64,826,609	8,125,458	14,307,052	1,059,234	24,202,471	1,749,456	49,790,710	76.80	15,035,899	11,472,473	10,090,870	13,871,284
Indiana Harbor Belt	Sept.	119	.....	.....	969,841	94,277	164,610	4,601	435,955	20,778	718,051	74.00	251,790	224,571	82,689	131,011
	9 mos.	119	.....	.....	8,034,300	1,105,155	1,178,027	42,045	3,628,331	205,794	6,149,910	76.60	1,884,390	1,652,636	580,816	1,155,128
Michigan Central	Sept.	1,862	4,941,044	1,709,459	7,429,070	967,510	1,200,085	108,038	2,423,006	152,711	4,934,273	66.40	2,494,797	1,967,353	1,959,354	1,143,446
	9 mos.	1,862	43,781,839	15,883,304	66,008,646	7,986,491	12,573,509	925,208	22,956,282	1,417,791	46,532,664	70.50	19,475,982	15,352,320	14,536,984	16,485,085
Pittsburgh & Lake Erie	Sept.	231	2,077,666	251,617	2,416,310	443,466	729,033	24,040	787,116	69,602	2,054,435	85.00	361,875	201,605	596,703	1,286,775
	9 mos.	233	20,299,462	2,349,477	23,553,057	3,268,574	7,297,250	221,237	7,665,784	639,196	19,100,963	81.10	4,452,094	3,034,546	6,038,473	13,085,932
New York, Chicago & St. Louis	Sept.	1,695	4,292,442	191,388	4,640,248	633,151	823,474	118,618	1,560,948	150,553	3,292,058	70.90	1,348,190	1,122,748	1,064,281	474,457
	9 mos.	1,695	36,953,883	1,617,971	40,038,339	5,553,570	7,524,283	1,069,546	14,899,127	1,382,022	30,464,013	76.10	9,574,326	7,494,883	6,331,012	8,045,575

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF SEPTEMBER AND NINE MONTHS OF CALENDAR YEAR 1924—CONTINUED

Name of road		Average mileage operated during period.	Operating revenues: Freight.	Passenger.	Total (inc. misc.)	Operating expenses: Maintenance of: Way and structures.	Equipment.	Traffic.	Transportation.	General.	Total.	Operating ratio.	Net from railway operation.	Operating income (or loss).	Net after rents.	Net after rents, 1923.
N. Y., New Haven & Hartford	Sept.	1,979	$5,080,431	$4,526,602	$10,722,647	$1,290,434	$2,275,296	$68,478	$3,942,049	$278,474	$8,003,852	74.60	$2,718,795	$2,315,916	$1,910,053	$1,492,104
	9 mos.	1,990	46,970,128	37,547,610	94,829,587	12,414,216	20,664,865	589,286	35,859,428	2,542,748	73,641,063	77.40	21,388,524	17,721,234	13,884,220	8,757,416
Central New England	Sept.	292	634,722	13,513	667,920	157,238	127,705	5,025	203,664	12,401	506,033	75.80	161,887	136,190	120,926	67,744
	9 mos.	295	5,723,874	118,037	6,034,567	1,077,781	1,136,599	45,574	1,870,441	106,994	4,337,389	71.90	1,697,178	1,465,604	1,198,689	610,913
New York Connecting	Sept.	20	217,744	.....	280,776	19,852	13,117	.....	48,250	1,133	82,352	29.30	198,424	157,674	118,840	111,548
	9 mos.	20	1,745,555	.....	2,224,086	121,939	128,079	.....	419,699	11,742	680,459	30.60	1,542,627	1,194,777	870,849	1,178,215
New York, Ontario & Western	Sept.	569	797,866	253,291	1,216,198	220,538	207,975	14,534	501,086	35,020	981,002	80.70	235,196	192,188	137,146	—177,355
	9 mos.	569	6,596,261	2,493,645	10,598,848	1,537,308	1,869,480	139,740	4,508,385	320,038	8,389,062	79.20	2,209,786	1,782,163	1,398,059	716,750
Norfolk & Western	Sept.	2,240	6,783,684	767,915	7,920,026	1,112,748	1,750,444	91,123	2,399,572	183,704	5,524,388	69.80	2,395,638	1,819,788	2,023,220	1,796,594
	9 mos.	2,240	58,668,534	6,829,016	68,398,581	11,011,166	16,559,082	793,851	21,834,775	1,514,432	51,756,938	75.70	16,641,643	10,955,761	12,320,019	14,360,332
Norfolk Southern	Sept.	931	530,286	106,584	684,643	101,662	103,015	23,233	278,478	29,116	536,751	78.36	147,892	104,774	85,989	123,981
	9 mos.	931	5,668,772	974,668	7,043,615	965,062	1,052,737	218,757	2,785,366	262,458	5,289,824	75.10	1,753,791	1,363,689	1,021,513	900,731
Northern Pacific	Sept.	6,700	7,331,592	1,080,444	9,176,637	1,006,672	1,398,913	155,152	2,997,082	229,172	5,890,466	64.20	3,286,171	2,574,784	2,732,190	2,879,894
	9 mos.	6,672	50,039,746	10,177,760	66,715,985	10,006,069	14,338,874	1,474,629	24,815,059	2,043,643	53,188,961	79.70	13,527,024	7,387,102	10,409,359	8,616,092
Northwestern Pacific	Sept.	480	491,039	194,389	746,158	94,280	83,145	5,824	244,059	17,548	444,492	59.60	301,666	255,352	244,571	224,743
	9 mos.	491	3,139,185	1,867,076	5,551,594	913,153	815,270	59,608	2,021,461	160,227	3,960,951	71.30	1,590,643	1,178,983	1,093,911	1,246,909
Pennsylvania	Sept.	10,508	38,340,383	13,264,514	56,664,502	7,444,789	13,038,568	635,867	20,373,630	1,418,083	43,721,945	77.20	12,942,557	9,476,695	8,176,830	7,221,823
	9 mos.	10,508	326,793,760	112,231,030	480,944,250	52,483,401	117,805,915	5,835,048	187,339,077	12,825,618	383,233,228	79.70	97,711,022	73,374,319	59,121,698	63,998,213
Baltimore, Chesapeake & Atlantic	Sept.	125	96,399	51,217	155,422	15,372	17,308	2,008	88,055	4,248	126,991	81.70	28,431	20,569	22,728	30,927
	9 mos.	108	767,207	346,973	1,159,723	112,473	230,849	18,386	705,355	32,770	1,099,833	94.80	59,890	11,886	8,715	—124,944
Long Island	Sept.	397	929,347	2,186,755	3,361,415	324,769	469,762	18,270	1,263,851	60,332	2,147,390	63.90	1,214,025	998,279	726,163	527,005
	9 mos.	397	7,612,158	17,260,089	26,930,827	3,239,798	4,296,308	197,102	11,395,610	583,197	19,817,807	73.60	7,113,020	5,681,401	3,826,493	3,505,405
West Jersey & Seashore	Sept.	360	438,309	881,485	1,393,915	177,108	223,090	32,883	585,393	39,604	1,058,746	76.00	335,169	211,172	170,021	267,828
	9 mos.	360	3,253,026	6,402,426	10,314,164	1,486,770	1,791,603	160,356	4,526,865	245,976	8,242,318	79.90	2,071,846	1,174,928	919,207	1,166,616
Peoria & Pekin Union	Sept.	19	32,314	3,438	161,268	39,244	16,344	779	67,004	7,668	131,039	81.20	30,229	16,229	42,240	47,417
	9 mos.	19	227,966	22,989	1,307,648	216,830	135,916	6,602	595,551	71,071	1,025,970	78.40	281,678	167,678	378,122	395,514
Pere Marquette	Sept.	2,292	3,001,956	387,187	3,666,267	484,848	753,695	50,177	1,197,010	100,162	2,578,012	70.30	1,088,255	900,447	785,824	553,179
	9 mos.	2,292	24,371,270	3,912,806	30,930,970	3,965,407	6,443,515	469,885	11,563,088	937,890	23,319,479	75.40	7,611,491	6,156,652	4,931,383	4,976,946
Pittsburgh & Shawmut	Sept.	102	95,550	3,029	102,102	15,302	31,655	1,352	28,682	6,397	83,388	81.60	18,714	18,503	31,838	6,836
	9 mos.	102	742,962	43,321	810,063	165,456	307,905	13,053	266,883	62,893	816,190	100.80	—6,127	—11,383	122,167	266,010
Pittsburgh & West Virginia	Sept.	92	391,257	7,257	432,106	33,602	109,951	4,869	76,652	19,759	254,543	58.90	177,563	125,192	195,145	127,397
	9 mos.	92	2,639,033	75,448	3,024,679	355,008	828,184	41,841	646,065	149,830	2,143,931	70.90	880,748	514,786	1,135,004	1,014,870
Pittsburgh, Shawmut & Northern	Sept.	210	139,039	3,493	148,039	22,774	35,772	1,604	50,969	4,621	115,690	78.10	32,349	29,685	23,670	—33,377
	9 mos.	210	957,934	44,826	1,043,053	222,502	290,470	14,648	436,083	50,959	1,014,662	97.30	28,391	4,194	—40,301	14,219
Quincy, Omaha & Kansas City	Sept.	250	74,929	17,522	104,644	33,418	10,073	859	49,016	2,543	95,880	91.60	8,764	4,657	299	—13,917
	9 mos.	250	515,828	190,701	784,976	278,215	142,391	8,795	392,998	25,837	846,473	107.80	—61,497	—98,208	—126,942	—198,439
Reading Company	Sept.	1,148	6,661,957	873,731	7,883,164	891,553	1,665,399	70,757	2,639,926	167,129	5,443,229	69.00	2,439,935	2,136,134	2,241,063	535,345
	9 mos.	1,149	57,575,647	7,673,790	68,319,498	8,146,393	16,470,768	648,295	25,453,713	1,737,119	52,515,785	76.90	15,803,713	12,626,252	13,827,518	23,953,551
Atlantic City	Sept.	169	118,679	307,538	462,566	115,118	30,599	7,368	224,289	4,845	382,359	82.70	80,207	60,225	28,285	12,632
	9 mos.	169	1,074,701	2,607,768	3,862,147	955,249	293,938	80,296	1,883,456	44,756	3,258,515	84.40	603,634	423,744	168,358	337,804
Perkiomen	Sept.	41	97,547	6,893	108,558	12,625	9,438	113	41,275	770	64,262	59.20	44,296	39,859	33,627	13,197
	9 mos.	41	804,596	58,528	895,693	85,750	50,470	975	384,718	7,123	529,370	59.10	366,323	324,811	274,280	233,287
Port Reading	Sept.	21	170,803	.....	213,411	22,804	7,330	229	62,938	4,926	98,227	46.00	115,184	110,920	61,031	—43,945
	9 mos.	21	1,219,843	.....	1,536,888	199,557	92,334	2,061	628,598	26,745	949,258	61.80	587,630	471,643	47,515	276,781
Richm'd, Fredericksburg & Potomac	Sept.	117	348,173	326,187	834,820	138,585	139,524	10,564	264,876	36,966	606,284	72.60	228,536	182,302	152,780	191,580
	9 mos.	117	4,458,679	3,077,811	8,987,118	1,052,314	1,361,919	83,237	2,958,360	300,028	5,951,263	66.20	3,035,855	2,529,016	2,026,919	2,244,124
Rutland	Sept.	413	292,398	139,013	566,400	117,779	94,295	9,189	214,349	12,195	449,786	79.40	116,614	86,525	84,094	97,584
	9 mos.	413	2,754,011	1,113,066	4,930,114	926,446	903,069	79,515	2,014,775	119,095	4,058,031	82.30	872,083	619,860	647,635	706,952
St. Louis-San Francisco	Sept.	4,747	5,815,023	1,527,030	7,823,713	984,972	1,623,806	93,630	2,299,806	192,074	5,167,191	66.00	2,056,522	2,158,855	2,180,547	1,472,892
	9 mos.	4,747	44,159,783	13,571,251	62,105,865	7,766,347	12,794,399	873,883	21,271,940	1,783,712	44,311,440	71.30	17,794,425	14,538,321	14,482,951	13,786,594
Ft. Worth & Rio Grande	Sept.	235	93,755	25,950	131,264	18,962	25,383	3,298	55,961	5,795	109,298	83.30	21,966	18,161	9,009	—3,857
	9 mos.	235	797,303	227,575	1,129,644	181,591	216,816	34,727	511,238	54,248	998,256	88.40	131,388	96,189	13,388	—97,838
St. Louis, San Francisco & Tex.	Sept.	134	163,934	16,140	187,489	38,417	31,712	4,746	58,841	6,814	140,529	75.00	46,960	44,852	19,629	30,220
	9 mos.	134	1,159,417	122,362	1,345,352	213,561	231,281	42,624	501,887	58,874	1,047,873	77.90	297,479	277,764	78,017	—47,851
St. Louis Southwestern	Sept.	969	1,238,047	143,772	1,476,907	208,831	291,893	45,846	369,046	61,423	992,149	67.20	484,758	386,794	331,328	481,661
	9 mos.	969	10,856,944	1,318,122	12,873,202	1,744,161	2,788,529	429,776	3,379,344	534,506	9,001,435	69.90	3,871,767	3,269,140	2,689,576	4,528,469
St. Louis Southwestern of Texas	Sept.	807	642,595	107,933	814,360	155,269	175,866	23,056	265,599	31,969	653,156	80.20	161,204	135,593	168,403	94,372
	9 mos.	807	4,407,780	824,812	5,699,687	1,321,814	1,565,807	196,275	2,295,819	275,351	5,688,772	99.80	10,915	—221,444	158,705	—801,444
San Antonio & Aransas Pass	Sept.	739	753,467	95,850	897,352	142,100	143,301	10,811	255,786	22,502	572,934	63.80	324,418	308,183	284,493	286,812
	9 mos.	739	4,333,142	668,225	5,324,908	1,140,645	1,156,565	101,199	1,955,356	198,797	4,534,701	85.20	790,207	640,907	509,957	322,744
San Antonio, Uvalde & Gulf	Sept.	317	99,911	20,846	133,042	24,094	13,375	4,607	48,601	5,911	96,588	72.60	36,454	33,174	22,164	23,638
	9 mos.	317	914,480	181,190	1,192,282	209,557	131,007	40,068	484,447	54,751	919,488	77.10	272,794	242,279	129,641	85,298
Seaboard Air Line	Sept.	3,570	2,819,515	699,763	3,987,776	662,723	733,470	137,520	1,464,481	168,521	3,197,538	80.20	790,238	598,450	658,085	656,067
	9 mos.	3,571	27,993,293	7,204,339	39,046,908	5,512,284	6,784,347	1,278,161	14,924,911	1,522,884	30,392,220	77.10	8,654,688	6,934,032	6,553,134	5,442,310
Southern Ry.	Sept.	6,868	8,478,108	2,620,674	12,089,444	1,609,527	2,160,550	218,767	3,837,016	317,780	8,222,522	68.00	3,866,922	3,149,200	3,122,676	2,343,651
	9 mos.	6,868	73,073,869	23,546,463	105,022,088	14,739,096	19,183,801	2,007,414	37,929,902	2,890,139	77,466,260	73.80	27,555,828	22,024,475	20,719,182	20,034,710
Alabama Great Southern	Sept.	318	653,517	171,277	878,120	144,269	177,058	21,171	252,122	23,871	625,941	71.30	252,179	203,740	236,976	165,046
	9 mos.	318	5,407,772	1,559,539	7,413,064	1,125,569	1,628,502	186,289	2,373,955	229,001	5,604,263	75.60	1,808,801	1,441,743	1,685,290	1,955,325

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF SEPTEMBER AND NINE MONTHS OF CALENDAR YEAR 1924—CONTINUED

Name of road		Average mileage operated during period.	Operating revenues: Freight.	Passenger.	Total (inc. misc.)	Operating expenses: Maintenance of Way and structures.	Maintenance of Equipment.	Traffic.	Transportation.	General.	Total.	Operating ratio.	Net from railway operation.	Operating income (or loss).	Net after rents.	Net after rents, 1923.
Cin., New Orleans & Tex. Pacific.	Sept.	338	$1,404,818	$305,418	$1,815,285	$258,172	$345,626	$41,096	$496,022	$46,220	$1,197,798	66.00	$617,487	$543,382	$569,213	$361,312
	9 mos.	338	12,459,775	3,093,766	16,406,840	2,457,337	3,354,234	358,192	4,858,402	426,994	11,562,794	70.50	4,844,046	4,162,256	4,026,974	3,633,423
Georgia, Southern & Florida	Sept.	401	289,962	126,123	447,420	74,232	61,598	8,728	137,657	10,498	295,006	65.90	152,414	134,196	97,365	40,010
	9 mos.	401	2,439,494	1,006,190	3,722,516	639,099	506,777	86,903	1,372,746	96,522	2,727,625	73.30	994,891	827,528	462,707	378,340
New Orleans & Northeastern	Sept.	207	393,801	81,602	514,294	68,125	83,050	11,221	148,503	15,117	330,361	64.20	183,933	147,832	120,358	76,758
	9 mos.	207	3,120,675	762,547	4,191,284	600,556	783,490	104,206	1,277,297	144,027	2,944,959	70.30	1,246,325	906,775	865,095	746,333
Northern Alabama	Sept.	110	101,254	11,173	115,732	20,147	6,330	2,087	38,610	2,920	70,094	60.60	45,638	41,590	11,565	40,046
	9 mos.	110	956,812	114,213	1,098,974	184,249	51,834	21,327	367,256	28,702	653,362	59.50	445,612	392,735	141,997	252,229
Southern Pacific	Sept.	7,199	13,026,225	3,362,269	18,130,837	2,078,374	2,535,131	272,802	5,888,829	502,674	11,532,803	63.60	6,598,034	5,016,985	4,621,283	5,201,143
	9 mos.	7,171	95,229,032	32,370,580	142,117,764	19,478,593	23,354,626	2,578,918	48,352,183	4,495,458	100,300,549	70.60	41,817,215	29,973,669	28,080,540	32,319,156
Arizona Eastern	Sept.	382	261,203	21,438	299,354	43,903	41,485	3,406	78,443	20,751	189,166	63.20	110,188	82,844	79,163	40,779
	9 mos.	382	2,218,729	220,074	2,569,530	422,900	390,603	30,333	804,049	186,323	1,844,191	71.80	725,339	481,727	436,140	732,090
Atlantic Steamship Lines	Sept.	...	835,551	49,501	984,740	15,247	207,603	17,605	676,355	28,956	945,766	96.00	38,974	26,883	26,752	155,914
	9 mos.	...	7,429,604	485,458	8,641,317	176,311	1,814,983	175,585	6,027,417	280,319	8,474,615	98.10	166,702	56,986	54,903	1,814,162
Galveston, Harrisb'g & S. Antonio	Sept.	1,379	1,971,846	405,782	2,514,381	285,987	384,979	44,582	756,958	88,752	1,571,835	62.50	942,546	910,149	832,902	386,905
	9 mos.	1,379	14,448,582	3,754,742	19,311,344	3,329,632	3,672,433	393,941	6,588,963	787,886	14,878,648	77.00	4,432,696	3,810,575	3,253,549	1,483,453
Houston & Texas Central	Sept.	923	1,084,796	258,266	1,433,857	161,894	210,866	26,890	422,804	40,761	862,422	60.10	571,435	497,328	433,723	350,025
	9 mos.	923	7,634,211	2,305,478	10,641,179	2,420,928	2,047,464	234,712	3,668,630	381,788	8,741,446	82.10	1,899,733	1,456,290	1,020,911	794,532
Houston, East & West Texas	Sept.	191	238,060	43,893	298,136	54,193	50,379	3,916	93,796	7,096	209,265	70.20	88,871	80,261	67,953	40,989
	9 mos.	191	1,819,878	397,293	2,341,401	670,312	517,583	33,665	875,082	73,614	2,163,431	92.40	177,970	114,220	6,031	54,660
Louisiana Western	Sept.	207	309,479	82,331	419,279	38,756	67,607	11,276	102,522	18,718	242,606	57.90	176,673	146,704	149,714	74,166
	9 mos.	207	2,057,046	765,804	3,055,562	428,446	624,947	105,236	917,503	163,990	2,273,604	74.40	781,958	531,678	558,165	626,227
Morgan's L. & T. R. R. & S. S. Co.	Sept.	400	585,689	129,189	773,037	92,555	165,395	18,172	277,788	35,504	591,855	76.60	181,182	129,992	105,291	40,539
	9 mos.	400	4,266,404	1,266,357	6,010,314	1,257,155	1,432,526	168,664	2,507,516	319,964	5,691,851	94.70	318,463	—119,223	—315,203	—62,370
Texas & New Orleans	Sept.	507	652,870	156,972	867,653	103,295	180,914	12,580	278,649	28,107	605,565	69.80	262,088	232,412	197,561	—100,240
	9 mos.	507	4,943,186	1,434,687	6,827,313	1,709,758	1,627,120	113,474	2,528,866	250,695	6,080,114	89.10	747,199	476,567	127,037	—21,602
Spokane International	Sept.	165	65,176	13,739	86,259	23,525	9,662	3,468	30,246	6,535	74,637	85.90	11,622	5,991	—2,489	5,865
	9 mos.	165	653,944	142,816	847,395	163,064	82,307	29,981	294,692	56,384	634,379	74.90	213,016	161,642	98,161	95,064
Spokane, Portland & Seattle	Sept.	554	568,236	125,658	770,153	102,640	95,933	11,387	227,744	19,533	465,766	60.50	304,387	236,283	202,883	144,743
	9 mos.	554	4,378,103	1,178,469	6,124,180	762,036	992,166	89,562	1,862,237	164,698	3,942,484	64.40	2,181,696	1,554,631	1,422,206	1,096,445
Tennessee Central	Sept.	296	210,827	45,181	269,604	36,417	38,091	5,898	94,235	9,750	184,243	68.30	85,361	75,496	53,218	9,874
	9 mos.	296	1,590,883	385,803	2,110,774	352,296	309,131	58,762	786,663	90,148	1,596,582	75.60	514,192	450,524	317,962	279,586
Term. Railroad Assoc. of St. Louis	Sept.	37	.....	.....	456,030	88,107	45,424	944	143,888	10,974	292,087	64.10	163,943	106,983	198,297	165,350
	9 mos.	37	.....	.....	3,756,751	835,957	410,817	8,835	1,359,490	81,147	2,724,918	72.50	1,031,833	500,191	1,318,555	1,702,815
East St. Louis Connecting	Sept.	1	.....	.....	180,073	15,551	13,200	270	62,642	3,142	94,805	52.60	85,268	82,070	61,496	60,140
	9 mos.	1	.....	.....	1,642,491	167,117	120,978	2,527	620,151	22,617	933,390	56.80	709,101	651,438	460,557	698,968
St. L. Merchants' Bridge Terminal	Sept.	9	.....	.....	411,530	92,210	28,875	872	163,992	8,254	294,203	71.50	117,327	97,887	105,970	61,267
	9 mos.	9	.....	.....	3,366,181	708,875	272,268	8,155	1,655,137	64,726	2,709,161	80.50	657,020	451,717	488,429	873,890
St. Louis Transfer Ry	Sept.	6	.....	.....	60,122	14,319	5,575	157	28,086	1,145	49,282	81.90	10,840	10,583	6,317	13,212
	9 mos.	6	.....	.....	589,566	94,140	60,013	1,469	343,511	11,274	510,407	86.60	79,159	77,444	23,307	151,028
Texas & Pacific	Sept.	1,952	2,115,585	620,793	2,977,260	361,636	553,927	59,143	927,082	120,623	1,980,742	66.50	996,518	845,258	782,925	653,020
	9 mos.	1,952	16,758,981	5,161,022	23,842,007	3,566,848	4,836,800	517,194	8,285,337	1,479,709	18,657,080	78.30	5,184,927	3,849,165	3,295,011	2,519,195
Toledo, Peoria & Western	Sept.	247	141,719	27,694	183,251	31,563	37,509	2,156	73,285	6,998	151,511	82.70	31,740	20,239	3,244	—25,897
	9 mos.	247	997,268	335,272	1,456,824	223,795	320,870	20,266	656,529	63,793	1,284,556	88.20	172,268	71,680	—20,898	—197,321
Trinity & Brazos Valley	Sept.	368	190,445	18,625	216,564	24,111	37,281	3,829	73,623	11,314	150,158	69.30	66,406	58,984	41,717	156,879
	9 mos.	368	1,243,979	173,741	1,484,406	457,227	441,312	30,797	681,565	105,653	1,711,029	115.30	—226,623	—291,582	—446,991	189,824
Ulster & Delaware	Sept.	128	64,351	31,475	134,353	25,300	15,812	1,414	65,678	6,807	115,011	85.60	19,342	13,842	8,021	—2,782
	9 mos.	128	545,526	335,590	1,199,040	191,483	156,959	16,448	558,676	60,867	984,433	82.10	214,607	164,983	119,381	133,518
Union R. R. of Penna	Sept.	45	.....	.....	913,335	110,281	252,214	213	372,807	8,609	744,124	81.50	169,211	140,561	169,321	334,893
	9 mos.	45	.....	.....	8,184,047	1,033,115	2,715,202	1,952	3,791,917	76,655	7,618,733	93.10	565,314	420,299	1,038,810	2,824,996
Union Pacific	Sept.	3,732	10,273,493	1,573,678	12,753,494	1,414,626	1,978,370	126,546	2,947,866	293,809	6,975,076	54.70	5,778,418	5,042,776	4,676,561	4,136,444
	9 mos.	3,717	59,820,380	13,400,236	80,590,842	10,762,984	16,197,222	1,393,265	22,449,763	2,554,472	55,005,638	68.30	25,585,204	19,422,423	18,087,659	18,839,714
Oregon Short Line	Sept.	2,383	2,719,552	427,714	3,379,228	539,289	475,513	43,061	1,009,164	113,189	2,238,672	66.20	1,140,556	884,750	767,972	713,978
	9 mos.	2,371	19,817,211	3,903,258	25,735,851	4,571,575	4,756,103	417,071	8,100,145	995,347	19,370,913	75.30	6,364,938	3,887,712	3,312,749	3,508,567
Oregon Wash. R. R. & Nav. Co.	Sept.	2,234	1,918,801	426,443	2,574,307	478,769	359,321	59,785	869,333	110,398	1,905,309	74.00	668,998	497,800	372,907	363,154
	9 mos.	2,231	15,641,875	3,791,175	21,339,176	4,015,055	3,476,879	575,461	7,667,773	1,041,853	17,017,793	79.70	4,321,383	2,782,154	1,904,752	—307,640
St. Joseph & Grand Island	Sept.	258	252,052	22,506	292,940	63,420	47,583	2,745	94,789	11,910	220,447	75.30	72,493	49,181	34,499	48,107
	9 mos.	258	2,042,377	211,359	2,411,878	471,790	411,518	25,634	939,427	108,385	1,957,461	81.20	454,417	308,777	197,614	28,891
Utah	Sept.	102	129,094	431	130,425	15,391	45,240	349	28,279	5,873	95,128	72.90	35,297	30,163	26,612	5,962
	9 mos.	102	1,064,765	3,789	1,074,492	142,717	359,523	3,242	248,287	56,938	810,703	75.50	263,789	205,226	148,578	88,588
Virginian	Sept.	545	1,458,325	66,412	1,632,617	228,007	310,260	12,990	401,938	47,780	992,013	60.80	640,604	545,989	563,383	552,165
	9 mos.	544	12,256,501	648,476	13,839,508	1,777,927	3,047,709	114,734	3,859,758	305,058	9,050,563	65.40	4,788,945	3,753,123	3,810,685	5,680,335
Wabash	Sept.	2,486	4,616,720	788,811	5,811,303	821,655	979,194	145,297	1,943,395	152,344	4,069,642	70.00	1,741,661	1,501,914	1,254,185	943,345
	9 mos.	2,486	37,718,382	7,122,617	48,308,913	7,468,990	8,438,567	1,225,143	1,871,364	1,441,485	37,525,804	77.50	10,873,109	8,753,426	6,260,267	6,755,309
Western Maryland	Sept.	804	1,488,162	69,462	1,629,118	298,790	292,457	36,444	504,529	45,212	1,190,326	73.10	438,792	358,792	295,538	405,223
	9 mos.	804	12,842,451	647,742	14,176,830	2,099,744	2,995,654	327,384	4,607,845	400,100	10,544,654	74.40	3,632,176	2,912,176	2,587,325	3,480,241
Western Pacific	Sept.	1,042	1,282,500	195,254	1,702,280	174,074	227,986	36,385	460,489	37,302	1,040,805	61.10	661,475	599,313	729,983	454,142
	9 mos.	1,042	7,746,248	1,660,797	10,392,726	2,272,813	1,889,122	325,340	3,509,966	349,666	8,666,521	83.40	1,726,205	1,030,716	1,754,608	1,964,177
Wheeling & Lake Erie	Sept.	511	1,495,512	52,348	1,662,137	229,150	410,909	28,035	534,047	37,133	1,241,791	74.70	420,346	312,493	269,569	276,621
	9 mos.	511	12,235,633	526,945	13,695,637	1,909,490	3,590,232	233,735	4,672,560	334,043	10,762,298	78.60	2,933,339	1,969,475	1,724,472	1,866,690

Labor Board's Powers Upheld

The power of the Railroad Labor Board to compel the attendance and testimony of witnesses at its hearings was upheld by Federal Judge James H. Wilkerson at Chicago in a decision handed down on November 6. The court refused to quash the petition of the Labor Board demanding that J. McGuire, general chairman, on the Chicago & North Western, of the Brotherhood of Locomotive Engineers, and D. B. Robertson, president of the Brotherhood of Locomotive Firemen & Enginemen, be compelled to testify in the long pending wage dispute between the enginemen and the western railways. Immediately after the decision was announced, Attorney Donald Richberg, representing the brotherhoods, declared that the case would be appealed and would eventually be taken before the United States Supreme Court if necessary.

In his decision, Judge Wilkerson says that the Transportation Act states in plain terms that the Railroad Labor Board may go before any district court with complaints against stubborn witnesses. He holds that the provisions in the Transportation Act for the enforcement of subpoenas of the Labor Board are constitutional. He quotes numerous precedents to sustain his ruling and refers to the Clayton Act and the Interstate Commerce Commission and the Federal Trade Commission laws.

Judge Wilkerson declared that it is now "firmly established that the processes of the court may be exercised in aid of an investigation by administrative bodies. It does not follow, because the decisions of the board are not enforceable under the statutes in the courts of the United States, and are merely published in order to guide public opinion, that the proceedings in court to compel evidence upon which to base the finding of the board are advisory, within the means of the cases cited."

Chicago Says "I Will"

The following resolution in furtherance of a transportation exposition in this country was passed by the City Council of Chicago on November 12:

"Whereas it is proposed to hold a great national or international

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OPERATING REVENUES AND OPERATING EXPENSES OF CLASS I STEAM ROADS IN THE UNITED STATES

(For 194 Steam Roads, Including 16 Switching and Terminal Companies)

For the Month of September, 1924 and 1923

Item	United States		Eastern District		Pocahontas Region		Southern Region		Western District	
	1924	1923	1924	1923	1924	1923	1924	1923	1924	1923
Average number of miles operated	236,165.42	235,936.78	59,501.47	59,356.86	5,458.15	5,449.49	38,354.33	38,449.80	132,851.47	132,680.63
Revenues:										
Freight	$399,037,605	$350,881,381	$165,955,914	$170,670,899	$16,841,528	$16,781,712	$48,734,185	$46,614,455	$167,505,978	$156,814,315
Passenger	a93,195,511	b105,902,309	47,527,153	52,600,133	2,141,590	2,524,989	11,562,186	13,241,782	31,964,582	37,535,405
Mail	7,795,012	7,484,741	2,920,211	2,747,262	193,133	177,602	1,130,356	1,081,517	3,551,312	3,478,360
Express	12,406,015	11,912,003	5,203,287	5,068,739	292,628	273,134	1,565,598	1,723,670	5,344,502	4,846,460
All other transp'n.	17,035,423	17,165,117	9,710,100	9,929,886	205,341	176,360	1,053,570	994,048	6,066,412	6,064,823
Incidental	10,731,369	12,009,795	5,321,797	6,239,578	350,463	352,658	973,904	1,036,029	4,085,205	4,381,530
Joint facility—Cr.	856,590	921,072	378,917	422,422	16,192	13,764	130,216	142,864	331,265	342,022
Joint facility—Dr.	218,924	214,708	107,522	110,696	3,537	2,058	30,825	32,915	77,040	69,039
Ry. operat'g revs.	540,838,601	546,061,710	236,909,857	247,568,223	20,037,338	20,298,161	65,119,190	64,801,450	218,772,216	213,393,876
Expenses:										
Maintenance of way and structures	72,829,915	76,687,125	30,082,498	33,834,507	3,002,961	2,733,499	9,942,057	9,963,954	29,802,299	30,155,165
Maint. of equipm't.	104,988,112	125,040,683	49,234,181	62,878,521	5,214,245	5,351,130	12,823,456	15,417,727	37,716,230	41,393,305
Traffic	8,127,342	7,812,495	3,122,939	3,005,049	208,639	189,037	1,405,677	1,419,635	3,390,087	3,198,774
Transportation	178,605,929	189,915,227	82,859,224	90,374,071	5,729,088	6,291,516	21,380,785	23,041,212	68,436,832	70,208,428
Miscel. operations	4,525,896	4,571,548	2,097,350	2,141,785	79,516	81,186	370,296	373,405	1,978,734	1,975,172
General	13,841,764	13,608,782	6,069,870	6,129,723	473,887	395,223	1,778,761	1,748,386	5,519,246	5,335,450
Transportation for investment—Cr.	1,095,738	970,619	123,708	173,371	64,791	23,387	198,447	88,129	708,792	685,732
Ry. operat'g exps.	381,623,120	416,665,241	173,342,354	198,190,285	14,643,545	15,018,204	47,502,585	51,876,190	146,134,636	151,580,562
Net revenue from railway operations	159,215,481	129,396,469	63,567,503	49,377,938	5,393,793	5,279,957	17,616,605	12,925,260	72,637,580	61,813,314
Railway tax accruals	33,586,622	29,245,342	13,366,881	12,692,300	1,107,667	1,248,978	4,256,508	3,476,034	14,855,566	11,828,030
Uncollectible railway revenues	113,750	118,381	50,859	54,821	2,756	3,265	14,938	10,573	45,197	49,722
Ry. operat'g income	125,515,109	100,032,746	50,149,763	36,630,817	4,283,370	4,027,714	13,345,159	9,438,653	57,736,817	49,935,562
Equipment rents—Dr. balance	7,078,074	5,697,850	3,014,020	2,190,055	d367,420	d313,490	d141,274	d118,340	4,572,748	3,939,625
Joint facility rent—Dr. balance	1,676,776	1,858,328	1,028,403	1,119,296	77,822	56,494	92,927	85,040	477,624	597,498
Net railway operating income	116,760,259	92,476,568	46,107,340	33,321,466	4,572,968	4,284,710	13,393,506	9,471,953	52,686,445	45,398,439
Ratio of expenses to revenues (per cent)	70.56	76.30	73.17	80.05	73.08	73.99	72.95	80.05	66.80	71.03
	For Nine Months Ended with September, 1924 and 1923									
Average number of miles operated	236,039.75	235,805.78	59,497.22	59,325.55	5,459.32	5,448.83	38,355.56	38,442.90	132,727.65	132,588.50
Revenues:										
Freight	$3,165,860,897	$3,443,988,635	$1,414,298,873	$1,625,676,014	$142,771,614	$142,671,366	$426,459,649	$442,006,298	$1,182,330,761	$1,233,634,957
Passenger	c824,096,543	e865,537,657	402,545,529	416,860,836	18,883,942	20,353,194	111,668,138	116,972,865	290,999,934	311,350,762
Mail	71,652,603	67,921,557	27,400,376	25,096,153	1,774,273	1,617,019	10,151,384	9,760,346	32,326,570	31,448,039
Express	103,184,112	112,354,047	45,332,061	51,840,354	2,350,610	2,567,782	14,023,826	14,224,111	41,477,615	43,721,800
All other transp'n.	143,215,352	149,615,621	82,500,593	88,557,808	1,669,997	1,665,977	8,102,376	8,301,697	50,942,386	51,090,139
Incidental	88,746,587	100,696,676	45,109,580	54,331,445	3,055,584	3,232,791	9,521,594	9,844,301	31,059,829	33,288,139
Joint facility—Cr.	7,740,394	7,536,259	3,212,305	3,428,840	135,451	129,127	1,161,490	1,192,875	3,231,148	2,785,417
Joint facility—Dr.	1,924,078	1,998,970	951,861	1,043,588	21,544	30,394	275,035	290,095	675,638	634,893
Ry. operat'g revs.	4,402,572,410	4,745,651,482	2,019,447,456	2,264,747,862	170,618,927	172,206,862	580,813,862	602,012,398	1,631,692,605	1,706,684,360
Expenses:										
Maintenance of way and structures	601,611,072	609,816,163	246,598,637	258,704,778	25,108,688	21,102,757	82,703,434	84,340,066	247,200,313	245,668,562
Maint. of equipm't	948,086,996	1,105,900,158	452,116,998	552,800,801	42,792,493	44,781,681	119,106,042	131,394,134	334,071,463	376,923,542
Traffic	73,825,426	69,533,683	27,804,211	25,863,968	1,866,382	1,688,628	12,847,927	12,485,202	31,306,906	29,495,885
Transportation	1,620,915,700	1,767,735,896	771,845,032	862,388,676	52,958,058	56,615,365	210,089,676	222,335,943	586,022,934	626,395,912
Miscel. operations	37,866,315	38,200 034	17,956,065	18,475,456	758,511	745,890	3,672,397	3,507,534	15,479,342	15,471,154
General	126,513,113	121,111,801	55,865,040	54,102,718	3,999,934	3,633,325	16,378,900	15,829,194	50,269,239	47,546,564
Transportation for investment—Cr.	9,853,939	7,613,522	1,387,772	942,917	314,829	173,199	1,211,919	870,911	6,939,419	5,626,495
Ry. operat'g exps.	3,398,964,683	3,704,684,213	1,570,798,211	1,771,393,480	127,169,237	128,394,447	443,586,457	469,021,162	1,257,410,778	1,335,875,124
Net revenue from railway operations	1,003,607,727	1,040,967,269	448,649,245	493,354,382	43,449,690	43,812,415	137,226,965	132,991,236	374,281,827	370,809,236
Railway tax accruals	254,617,852	248,317,229	105,122,421	105,793,071	10,617,593	9,006,701	31,643,827	30,112,711	107,234,011	103,404,746
Uncollectible railway revenues	1,522,895	1,178,532	703,416	533,558	34,946	56,892	147,924	113,721	636,609	474,361
Ry. operat'g income	747,466,980	791,471,508	342,823,408	387,027,753	32,797,151	34,748,822	105,435,214	102,764,804	266,411,207	266,930,129
Equipment rents—Dr. balance	53,609,210	51,704,859	33,376,499	34,216,413	d 2,960,330	d 3,801,273	3,133,967	5,929,261	20,057,074	15,360,458
Joint facility rent—Dr. balance	15,887,780	16,574,535	8,147,908	8,863,477	890,263	1,003,511	936,769	785,772	5,912,840	5,921,775
Net railway operating income	677,969,990	723,192,114	301,299,001	343,947,863	34,867,218	37,546,584	101,362,478	96,049,771	240,441,293	245,647,896
Ratio of expenses to revenues (per cent)	77.20	78.06	77.78	78.22	74.53	74.56	76.37	77.91	77.06	78.27

a Includes $3,399,896 sleeping and parlor car surcharge. b Includes $3,583,941 sleeping and parlor car surcharge. d Deficit or other reverse items. e Includes $27,914,133 sleeping and parlor car surcharge. e Includes $27,635,069 sleeping and parlor car surcharge.

(Compiled by the Bureau of Statistics, Interstate Commerce Commission. Subject to revision.)

exposition of progress in this country during 1930, or thereabout, as a fitting observance of the culmination of one hundred years of American rail transportation, conceded to be the greatest single agency of our national development and the keystone of our national unity and defense, and

"Whereas Chicago is interested in the success of such an exposition by reason of its potential influence for promoting further the progress and good repute of this country, and by reason also that to its railroads Chicago owes in large part its wondrous growth in population, wealth and power, and

"Whereas Chicago is the greatest railway center in this country and the world and has the natural advantages in location, climate and communication by water as well as by land that are essential to assure the success of such an exposition, among which are the natural advantages still present and available which made the World's Columbian Exposition the outstanding celebration of its kind, and

"Whereas, the year 1930 will mark the one hundredth anniversary of the surveying and platting, and therefore the birth of our great city, which is in itself an occasion for a celebration of proportions,

"*Therefore*, be it resolved that the mayor of the city of Chicago be authorized and instructed to call together representatives of the leading organizations in the city and other influential citizens for the purpose of discussing the desirability of inviting the rail centennial exposition to Chicago, and also of celebrating, separately or in conjunction therewith, the one hundredth year of Chicago's growth."

Radio on the New York Central

Radio election returns were provided for passengers aboard the Twentieth Century Limited on the New York Central, which ran on election night in three sections eastbound and three sections westbound. The receiving sets were placed on the book-case shelves at the forward end of the observation cars at the rear of the trains, each one manned by an engineer from the Western Electric Company. Except for temporary interruptions and retuning due to change of broadcasting stations every person in the cars, which were filled to capacity with passengers from the

Listening to Election Returns on the "Century"

adjoining Pullmans, heard the election bulletins. Doors of the observation cars were kept ajar and the reports were heard distinctly by the groups on the observation platforms out-of-doors.

The all-steel cars, the oscillation and swing of the trains around curves and even their passage through tunnels and highest speed, failed to prevent the continuous delivery of election returns of the United Press Association. In all respects this fast-train radio service was the most notable success yet attained from prolonged experiments along this line, and with many lessons learned the company is now considering permanent installation on its fast trains of radio sets adapted to give news and entertainment programs.

The next service of news bulletins on New York Central trains will occur on November 20, when the first train will be run over the Castleton bridge across the Hudson river south of Albany, N. Y., when Hon. Chauncey M. Depew and state officers of New York and Massachusetts and the federal government will be the first passengers and participate in ceremonies at Albany. These ceremonies will be broadcast and heard by improved receiving apparatus aboard trains at various points over the New York Central System.

Argument for Reduced Westward Grain Rates in Canada

Another phase of Canada's pressing freight rate problem was presented last week at Vancouver, B. C., when the Dominion Railway Board, represented by Chairman H. A. McKeown and Commissioner Frank Oliver, heard arguments supporting British Columbia's demand for equalized freight rates on westbound and eastbound grain. George Bingham, representative of the Saskatchewan Co-Operative Elevator Company, told the board that his company was compelled to build an elevator at Buffalo, N. Y., to handle Canadian grain through foreign territory. He argued that high ocean rates and canal charges this season have had the effect of putting Vancouver at a disadvantage with New York for the greater part of the time. He declared that rail rates must be reduced from the prairie to the Pacific if the Pacific route is to survive.

Robert McKee, general manager of the Canadian Grain & Export Company, declared that the grain route is suffering from a discrimination of from 3 to 4 cents a hundred pounds on grain from the prairies to Vancouver for export. He named the following six factors as justifying an equalization of westbound with eastbound grain rates:

1. Shorter grain haul.
2. Greater efficiency per freight car, the shorter haul permitting cars to do more service.
3. Better weather conditions on the Western route would go a long way toward reducing the operating costs of winter grain movement.
4. Quicker release of funds by shorter rail haul would lift a burden falling upon Canadian banks, it being possible to load grain and have it delivered on the ship in Vancouver within ten days.
5. Vancouver is open the year round.
6. Western route means trade to Canadian ports, diverting the flow of Canadian grain from Eastern United States routes and American shipping lines.

That Vancouver had reached the end of its "grain boom" was the statement made by G. G. McGeer, representing the government of British Columbia, who declared that that port might even now have more elevators than could be used unless freight charges on grain were equalized. It was argued that the grain trade is proving this season the inability of Vancouver to overcome with a normal crop the great handicap of unfair freight rates and to compete, as it did last year, when there was a bumper crop, with the long established eastbound route.

Pan-American Conference on Standardization, Lima, Peru

The Peruvian government has invited the twenty-one republics in the Pan-American Union to a conference on standardization to be held at Lima, Peru, beginning December 23 of this year. The conference is called by the Pan-American Union at the request of the Fifth International Conference of American States which met at Santiago, Chile, in 1923. The Peruvian government will act as host. Sixty technical and trade organizations in this country have been invited to send representatives and there will be representatives of similar organizations from other countries.

The general purpose of this conference will be to study the possibilities of developing inter-American and international standards for raw and finished materials as well as standardized classifications and nomenclature and to make recommendations with regard to the steps to be taken by the states looking toward the development of these objectives.

The Peruvian Government has sought the co-operation of the Pan-American Union and the Inter-American High Commission in the development of plans and agenda and these departments in turn have sought the advice of representative organizations and individuals. The preparatory work in questions relating to agri-

cultural products and raw materials are being handled by the United States Departments of Commerce and Agriculture. The American Engineering Standards Committee has assumed an important part in preparing for the work among the manufacturing industries of this country and at the request of Director-General Rowe has organized an advisory committee.

No attempt will be made to adopt actual standards at this meeting but it is believed that a substantial basis for inter-American standardization can be laid, first, through the development and encouragement of standardization work in the various states and, second, through the designation of some organization which will act as a central agency for the development of inter-American standardization. It is expected that plans will be made for a second conference within a couple of years.

Pullman Company Keeps Shops Clean

The Pullman Car & Manufacturing Company has adopted a novel idea to further its clean-up campaign for eliminating waste materials and rubbish in the various departments and keeping the premises in a clean and orderly condition. In addition to awarding a banner to each department wherein the premises are clean and orderly, a committee designates the dirtiest place in the plant, and a large sign is set up at this point; which sign cannot be moved until the department is made clean and in good order.

The plan was first tried at the Michigan City (Ind.) shops in

A "Banner" Which Identifies the Most Untidy Department

[The men in the picture represent, presumably, the awarding committee, not the victims who are to be pilloried.]

July, 1923, with a sign reading: "This is the Dirtiest Place in the Plant." The psychology of the sign was so effective that it has been impossible to award the sign to that or any other department since that time.

The housekeeping committee of the St. Louis shops has recently adopted the same idea and is awarding a sign which reads, "We Win the Dirty Medal" to the department which deserves it. This sign remains in the department until another is found with more disorderly habits.

Traffic News

The Union Pacific is now using the Southern Pacific station at Fifth street and Central avenue, Los Angeles, Calif., for its passenger trains.

W. J. L. Banham, of New York City, chairman of the Atlantic States Shippers' Advisory Board, has been elected president of the New York Board of Trade and Transportation.

The Pennsylvania has applied to the Public Utilities Commission of Ohio for authority to discontinue five passenger trains operating on its Dayton-Lebanon division and between Cincinnati, Ohio, and Melford.

A new daily package car service between Memphis, Tenn., and Leachville, Ark., has been inaugurated by the Missouri Pacific in conjunction with the Jonesboro, Lake City & Eastern. The car leaves Memphis at 7:30 p. m. daily and reaches Leachville the following morning.

The Longview, Portland & Northern plans to have its entire road from Ryderwood, Wash., to Longview in operation by December 15. This company expects to put a gasoline motor car into operation on November 15 on the finished portion between Ryderwood and Vader.

The average train load on the Chicago, Milwaukee & St. Paul during September was 743 tons or 13 per cent greater than the average load in the same month last year and is a record for the road. The increased train load enabled the road to handle its September tonnage with about 250,000 fewer train miles than would have been required with the average train load of a year ago. The average includes branch lines, where trains are run on schedule regardless of light tonnage. The average mileage per car per day was 30, compared with 28 in September, 1923.

In order to facilitate the handling of passenger traffic during heavy convention seasons the Pullman Company, the railroad associations and a number of the largest organizations holding conventions are endeavoring to arrange a schedule of dates for conventions which will reduce the peak load. It is estimated that five conventions alone next summer will call for approximately 500 sleeping cars and the dates are so close together that cars used by the first cannot be returned in time to be available for the last. E. L. Bevington of the Transcontinental Passenger Association, New York, has been designated to act as a clearing agent for a committee of transportation companies and has asked all organizations to consult him as to convention dates for 1926.

Freight Traffic in September

Freight traffic during the first nine months this year was 8.6 per cent below that for the corresponding period in 1923, according to a compilation by the Bureau of Railway Economics. For the nine months' period it amounted to 314,275,564,000 net ton miles, a decrease of 29,438,453,000 net ton miles.

In the Eastern district there was a decrease of 12.3 per cent, due mainly to a falling off in the loading of coal, coke and ore, while in the Southern District a decrease of 7.1 per cent was reported. In the Western district there was a decrease of 3.5 per cent.

For the month of September alone freight traffic amounted to 39,046,466,000 net ton miles, a decrease of only 414,376,000 net ton miles or 1.1 per cent under that of September last year. In the Eastern district a decrease of 5.4 per cent was reported while in the Southern district there was a decrease of 3 per cent. Railroads in the Western district reported an increase of 5.3 per cent.

The daily average movement per freight car in September was 28.9 miles, the greatest for any September on record with the exception of September last year, which exceeded it by three-tenths of a mile. The average for September this year was an increase of 2.2 miles over the daily average for August.

The average load per freight car in September was 27 tons, two-fifths of a ton less than the average for the same month last year and one-tenth of a ton below that for August, 1924.

Foreign Railway News

Strike on Austrian Railways

The employees of the Austrian State Railways, who have been refused increases in wages, have gone on strike. The result has been a general tie-up of traffic and the resignation of Premier Seipel and his cabinet. The refusal of the president of the railways to grant the increase asked by employees was due to the fact that, under the auspices of the League of Nations, these railways are supposed to be a money-making enterprise. The limit of expenditure permitted them has been set and an increase would cause the budget to be exceeded. As the *Railway Age* goes to press, the officers of the union and the government have agreed to a compromise to settle the strike and, if the membership of the unions approve, work will doubtless be resumed soon.

Indian Railway Budget Handled Separately

The proposal made last March by the government of India to separate railway finance from the general finances of the country was held up by the Legislative Assembly until near the end of September, according to the Times (London) Trade Supplement. After prolonged debate, in which the scheme underwent amplification and many amendments of substance, it received the approval of the Legislature.

The original proposal was that in return for separation from the general budget the railways should contribute, as a first charge on earnings, a contribution equal to five-sixths of 1 per cent on the capital at charge of the railways (excluding capital contributed by companies and Indian states and capital expenditure on strategic railways), plus one-fifth of any surplus profits remaining after payment of this fixed return. The contribution is now to be 1 per cent on the capital at charge of commercial lines.

It is provided that if in any year the revenues are insufficient for the percentage, surplus profits in the next or subsequent years will not be deemed to have accrued for purposes of division until such deficiency has been made good. The interest on the capital at charge and the loss in operating strategic lines is to be borne by general revenue, and is consequently to be deducted from the contribution so calculated in order to arrive at the net amount payable from railway to general revenues each year.

Any surplus remaining after the payment to general revenues is to be transferred to a railway reserve, provided that if the amount available for such transfer exceeds in any year 3 crores of rupees only two-thirds of the excess over 3 crores of ruprees is to be transferred to the railway reserve and the remaining one-third will accrue to general revenues. The reserve is to be used to secure the payment of the annual contribution; to provide, if necessary, for arrears of depreciation and for writing down and writing off capital; and to strengthen the financial position of railways in order that the services rendered to the public may be improved and rates may be reduced. The railway administration is to be entitled, subject to prescribed conditions, to borrow temporarily from capital or from the reserves to meet expenditure for which there is no provision or insufficient provision in the revenue budget.

There is to be a standing Railway Finance Committee of the Legislative Assembly, and the Railway Department must place its estimates of expenditure before the committee prior to the date for discussion of the demand for grants for railways. The railway budget is, if possible, to be presented to the Assembly in advance of the general budget; separate days are to be allotted for its discussion, and the member in charge of railways is then to make a general statement on railway accounts and working.

The Assembly has appended two recommendations to the text of the scheme. The first is that the railway services should be rapidly Indianized, and that Indians should be appointed as members of the Railway Board as early as possible. The second is that the purchase of stores for the state railways should be undertaken through the organization of the Stores Purchase Department of the Government of India. At present, in the case of such locomotives, rolling stock, and other stores as are not obtainable in India, the purchases are made through the India Stores Department in London.

Equipment and Supplies

Locomotives

THE NORTHERN PACIFIC is inquiring for one snow plow.

THE NEW YORK CENTRAL is inquiring for from 25 to 50 locomotive tenders.

THE MISSOURI, KANSAS-TEXAS is inquiring for 10, 8-wheel switching locomotives.

THE TERMINAL RAILROAD ASSOCIATION OF ST. LOUIS is inquiring for 15, 8-wheel switching locomotives.

THE LOUISIANA & ARKANSAS has ordered 2 Mikado type locomotives from the Baldwin Locomotive Works.

THE CADDO RIVER LUMBER COMPANY has ordered 1 Prairie type locomotive from the Baldwin Locomotive Works.

THE KAHULUI RAILROAD COMPANY, Hawaii, has ordered one Mikado type locomotive from the Baldwin Locomotive Works.

Freight Cars

THE ELGIN, JOLIET & EASTERN is inquiring for 500 steel underframes.

THE HUNTINGDON & BROAD TOP MOUNTAIN contemplates buying 50 hopper cars.

THE CENTRAL OF GEORGIA is inquiring for 500 steel underframe box cars of 40 tons' capacity.

THE CANADIAN NATIONAL contemplates buying 1,000 box cars, 1,000 automobile cars and 250 refrigerator cars.

THE SUN COMPANY, Philadelphia, Pa., has ordered 7 compartment car tanks from the Standard Tank Car Company.

THE BUFFALO CREEK & GAULEY has placed an order for repairs to 150 hopper cars with the Pressed Steel Car Company.

THE RIO DE JANEIRO LIGHT & POWER CO. (Brazil) is inquiring through the car builders for 10 gondola cars of 40 tons' capacity.

THE CONLEY TANK LINE, Pittsburgh, Pa., has ordered 6 insulated tank cars of 8,050 gal. capacity, from the Standard Tank Car Company.

THE MISKO REFINERIES, Laredo, Texas, has ordered 2 triple compartment tank cars of 8,050 gal. capacity from the Standard Tank Car Company.

THE LONG ISLAND, reported in the *Railway Age* of October 25 as inquiring for 15 caboose cars, has ordered these cars from the Pressed Steel Car Company.

THE CADDO CENTRAL OIL & REFINING COMPANY, New York City, has ordered one tank car of 8,050 gal. capacity, from the Standard Tank Car Company.

THE MISSOURI PACIFIC is rebuilding a number of 40-ton wooden coal cars, some 50-ton steel coal cars, and some refrigerator cars in its De Soto, Mo., shops.

THE NORTHERN PACIFIC, reported in the *Railway Age* of November 1 as expecting to ask for bids on 800 gondola cars is now inquiring for this equipment.

THE BALTIMORE & OHIO, reported in the *Railway Age* of November 6 as inquiring for car ends and under car repairs for 2,000 hopper cars, will repair these cars in its own shops.

THE GREAT NORTHERN, reported in the *Railway Age* of October 11 as inquiring for 40 air dump cars, has ordered 40, 30-yd. air dump cars from the Pressed Steel Car Company. The Great Northern is expected to enter the market soon for 25 steel underframe caboose cars.

THE SOUTHERN RAILWAY, reported in the *Railway Age* of November 1 as asking for bids on 1,000 car sets of steel center sills, has ordered 1,000 steel underframes from the Virginia Bridge & Iron Co.

THE CHICAGO, BURLINGTON & QUINCY, reported in the *Railway Age* of October 25 as asking for prices on the repair of 1,000 gondola cars of 50 tons' capacity, will make the repairs to these cars in its own shops.

THE TEXAS COMPANY, reported in the *Railway Age* of October 18 as inquiring for from 500 to 1,000 tank cars of 10,000 gal. capacity, has ordered 1,000 tank cars from the Pennsylvania Car Company.

THE ATCHISON, TOPEKA & SANTA FE, reported in the *Railway Age* of August 30 as expecting to come into the market soon for 5,000 cars, has ordered 500 gondola cars and 500 refrigerator cars from the American Car & Foundry Co., and 1,000 box cars from the Pullman Car & Manufacturing Corporation.

THE NORFOLK & WESTERN, reported in the *Railway Age* of October 25 as inquiring for 3,000 all steel gondola cars of 57½ tons' capacity, has divided equally the order for this equipment between the Pressed Steel Car Company, the Ralston Steel Car Company and the Newport News Shipbuilding & Dry Dock Co.

THE NEW YORK CENTRAL has ordered 3,000 all-steel box cars of 55 tons' capacity as follows: For the New York Central Railroad, 500 from the Pressed Steel Car Company and 500 from the Merchants' Dispatch Transportation Company; for the Cleveland, Cincinnati, Chicago & St. Louis, 1,000 from the American Car & Foundry Company; for the Michigan Central, 1,000 from the Standard Steel Car Company.

Passenger Cars

THE GREAT NORTHERN is expected to enter the market soon for three dining cars.

THE CENTRAL OF GEORGIA is inquiring for 5 coaches and one combination baggage and mail car.

THE MISSOURI SOUTHERN has ordered one combination passenger and baggage gasoline rail motor car from the J. G. Brill Company.

THE CHICAGO & NORTH WESTERN, reported in the *Railway Age* of October 18 as having authorized the purchase of 50 passenger cars is now inquiring for 24 coaches; 23, 60-ft. steel baggage cars and 3, 60-ft. or 70-ft. steel combination baggage and mail cars with four or six wheel trucks.

Iron and Steel

THE NEW YORK, CHICAGO & ST. LOUIS has authorized the purchase of 20,000 tons of rail.

THE NORTHERN PACIFIC has ordered 15,000 tons of rail from the Illinois Steel Company.

THE CHICAGO, MILWAUKEE & ST. PAUL has ordered 28,000 tons of rail from the Illinois Steel Company.

THE CHESAPEAKE & OHIO has ordered 12,000 tons of rail from the Inland Steel Company and 12,000 tons from the Illinois Steel Company.

Machinery and Tools

THE NEW YORK CENTRAL has placed an order for a 6-ft. plain radial drill.

Miscellaneous

THE NORFOLK & WESTERN will receive bids until 12 o'clock noon, November 19, at Roanoke, Va., for 200 cast steel side frames and 300 wrought steel wheels. The company will receive bids until 12 o'clock noon, November 26, for 1,700 sheets of jacket steel and 500,000 galvanized tie dating nails.

THE DETROIT, TOLEDO & IRONTON has given an order to the International Combustion Engineering Corporation, 43 Broad street, New York, for the initial installation on one of its large freight locomotives, of powdered fuel burning equipment. This locomotive will burn for its fuel the coke left after the coal has been treated and all the by-products recovered at the River Rouge, Mich., plant.

Signaling

THE PERE MARQUETTE has ordered from the Union Switch & Signal Co., an electro-mechanical interlocking for Erie, Mich., six mechanical and five electric levers, together with a number of color-light signals, style "R."

THE ATLANTIC COAST LINE has ordered from the Union Switch & Signal Co., 64 semaphore signals, style "S," three position, together with relays and other apparatus, to be installed on its line between Burroughs, Ga., and Altamaha; together with additional apparatus for interlocking machines at Burroughs and two other places.

THE DELAWARE, LACKAWANNA & WESTERN has ordered from the Union Switch & Signal Co. an addition for the electro-pneumatic interlocking at Hoboken, N. J., 23 levers; also 20 semaphore signals and other apparatus to provide for a large addition to the yard. The same road has ordered also an additional section, 11 levers, for the electro-pneumatic interlocking at Grove street, Hoboken, together with a number of switch movements.

THE GREAT NORTHERN has authorized the installation of automatic train control between Minot, N. Dak., and Williston and the equipping of passenger locomotives for automatic train control. This company has also authorized the installation of automatic signals on 296 miles between Williston, N. Dak., and Wolf Point, Mont., and between Havre, Mont., and Cut Bank. In addition automatic signals have been authorized on 47 miles of line between Cut Bank, Mont., and Blackfoot; between Summit and Java and between Columbia Falls and Whitefish.

FREIGHT CARS ORDERED, INSTALLED AND RETIRED

Month 1924	Domestic orders reported during month	Installed during month	Aggregate capacity tons	Tired during month	Aggregate capacity tons	Owned at end of month	Aggregate capacity tons	On order as of first of following month	Building in R. R. shops
January	6,020	15,589	707,367	12,329	516,695	2,310,032	100,644,107	21,696	2417
February	18,365	11,386	554,481	10,466	411,228	2,310,570	100,767,731	40,030	2715
March	35,846	9,562	446,043	8,726	352,481	2,311,405	101,165,332	62,340	2697
April	11,189	8,718	369,978	8,026	306,288	2,312,074	101,223,891	62,289	2739
May	435	9,199	439,516	9,059	360,212	2,312,237	101,303,200	57,266	2467
June	387	10,909	538,118	8,347	321,094	2,314,798	101,569,593	57,735	2269
July	533	16,583	1,151,302	8,413	316,927	2,322,968	102,388,652	51,156	4602
August	4,751	15,452	785,288	8,834	333,171	2,329,582	102,845,000	40,961	3618
September	22,520	15,455	779,078	9,337	370,607	2,336,147	103,270,000	47,553	3045
October	11,853	.....	.....	.....	.....	.....	.....	.....	.....
Total for 9 months		112,853	.....	.....	.....	.....	.....	.....	.....
Total for 10 months	111,899	.....	.....	.....	.....	.....	.....	.....	.....

(1) Details as to orders from *Railway Age* Weekly reports. Figures include all domestic orders placed with builders and railroad shops but not rebuilt equipment.

(2) Figures as to installations and retirements prepared by Car Service Division A. R. A. Figures cover only those roads reporting to the Car Service Division. They include equipment received from builders and railroad shops. Figures of installations and retirements alike include also equipment rebuilt to an extent sufficiently so that under the accounting rules it must be re'ired and entered in the equipment statement as new equipment. The figure as to orders as given in the first column of table is not strictly comparable with figures relating to installations given in succeeding columns.

Supply Trade News

The American Bridge Company has moved its Cleveland, Ohio, office to 1450 Rockefeller building.

The Pullman Company will award 20 annual scholarships of $250 each to deserving students of agricultural colleges at the International Livestock Exposition to be held in Chicago in December.

The stockholders of **Joseph T. Ryerson & Son, Inc.,** Chicago, have bought a substantial interest in the **Reed-Smith Company** at Nineteenth and South Canal streets, Milwaukee, Wis. The Reed-Smith Company is an independent steel warehousing company serving the industry in that section of the country. It has a large and varied line of finished steel products in stock, with facilities for quick shipment. The officers of the Reed-Smith Company of Milwaukee are now as follows: **D. M. Ryerson,** president; **George W. Smith,** vice-president and general manager; **E. L. Hartig,** treasurer and **Carl Gallauer,** secretary. Donald M. Ryerson is a vice-president of Joseph T. Ryerson & Son, Inc., with headquarters at Chicago. He is a grandson of the founder of Joseph T. Ryerson & Son, Inc., and his entire business career has been with that firm. G. W. Smith was formerly a partner of the Reed-Smith Company. E. L. Hartig is vice-president, secretary and treasurer in Chicago of Joseph T. Ryerson & Son, Inc., and Carl Gallauer was in charge of its Milwaukee office. The Milwaukee stocks and facilities of the Reed-Smith Company are to be increased, and in addition, Joseph T. Ryerson & Son, Inc., will maintain daily car service from Chicago for prompt delivery of special orders.

D. M. Ryerson

G. W. Smith

Frederick E. Bausch, 1105 Chemical building, St. Louis, Mo., has been appointed district representative in eastern Missouri and southern Illinois, of the **Conveyors Corporation of America,** Chicago.

The Premier Staybolt Company, Pittsburgh, Pa., has opened a Chicago office in the Peoples Trust & Bank building, 30 North Michigan boulevard. **L. W. Widmeier,** assistant to the president is in charge of this office.

Harold Blum, sales and advertising manager of the Rail Welding & Bonding Co., Cleveland, Ohio, has been appointed sales engineer of the **Cleveland Railway Supply Company,** with headquarters at Cleveland, Ohio.

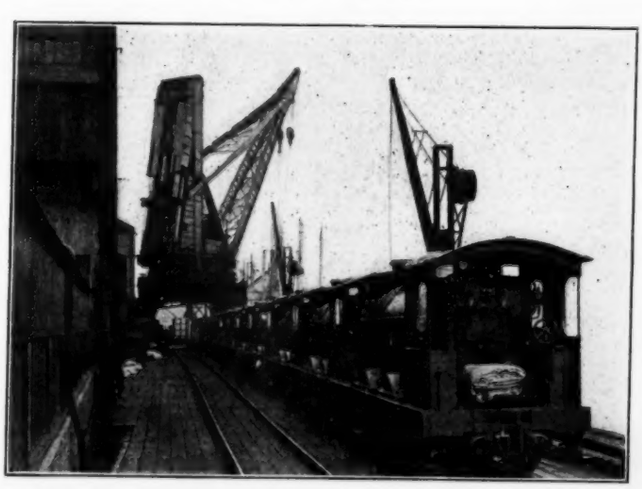
Ralph W. Payne, with headquarters in the Metropolitan Bank building, 613 Fifteenth street, N. W., Washington, D. C., has been appointed exclusive southern representative in charge of sales and engineering for the southern territory, for the **Magnetic Signal Company,** Los Angeles, Cal.

W. R. Hans, who has been in the service of the **Whiting Corporation,** Harvey, Ill., for a number of years, has been placed in charge of a new district sales office opened by that company at 997 Ellicott square building, Buffalo, N. Y., to succeed its former agent, George F. Crivel & Company, Buffalo.

N. P. Farrar, district manager of the Philadelphia territory for the **Pawling & Harnischfeger Co.,** Milwaukee, Wis., has been appointed assistant sales manager. **H. L. Mode** has been appointed sales representative in the eastern territory, with headquarters at New York and Philadelphia, Pa. Mr. Mode was formerly in the motor department of the General Electric Company.

R. C. Broach of Atlanta, Ga., and formerly in the general sales department at St. Louis, Mo., of the **Heine Boiler Company,** St. Louis, has been appointed this company's southeastern district manager with office at 709 Glenn building, Atlanta, Ga. The southeastern territory consists of eastern Tennessee, North and South Carolina, Alabama, Georgia and Florida. **S. B. Alexander,** Charlotte, N. C., will continue as the company's special representative in North and South Carolina.

The Stewart Warner Speedometer Corporation, Chicago, has acquired control of the Bassick-Alemite Corporation of that city. Owners of a majority of the stock in the Bassick-Alemite Corporation have already consented to the sale and the privilege of participating in the transaction will be extended to the minority stockholders on the same terms. The terms of the transaction have not yet been worked out. The Bassick-Alemite Corporation owns all of the outstanding common stock of the Bassick Company which has plants at Bridgeport, Conn., and Meriden and Newark, N. J., and also 5,000 shares of the capital stock of the Bassick Manufacturing Company with a plant at Chicago. The remainder of the stock of the latter company is owned by the Bassick Company. In May, 1924, the Bassick-Alemite Corporation acquired by purchase the Allyne-Zerk Company, Cleveland, Ohio, manufacturers of a lubricating device and in January it acquired 51 per cent stock interest in the E. S. Evans Company, manufacturers of blocks, crating and boxes used in the shipment of automobiles.



Locomotives for India Waiting to Be Loaded on Shipboard—Built by Sir W. G. Armstrong-Whitworth Co., Newcastle-upon-Tyne.

Railway Construction

ATCHISON, TOPEKA & SANTA FE.—This company plans the construction at San Diego, Calif., of a freight classification yard, roundhouse and repair shops, the entire project to cost approximately $750,000.

BALTIMORE & OHIO.—This company has awarded a contract to the American Bridge Company covering the fabrication and delivery of steel work for the superstructure of grade crossing elimination bridge, at Silver Spring, Md. Approximately 420,000 lbs. of steel work is involved. The work is being prosecuted in conjunction with the Maryland State Road Commission. The new structure will consist of three spans of deck plate girders, supporting two railroad tracks and two sidewalks; total length 87 ft.

CHESAPEAKE & OHIO.—This company will close bids on November 17 for the laying of 17,000 ft. of 12-in. cast iron pipe and of 1,238 ft. of 6-in. vitrified drain pipe at Russell, Ky. The erection of a 40-ft. by 50-ft. steel tank and three water columns is included in the project.

CHESAPEAKE & OHIO.—This company has awarded a contract to the Chicago Bridge & Iron Works for the erection of a 50,000-gal. all steel tank on an 18-ft. tower at Anthony, W. Va. A contract has been awarded to the same company for the erection of a steel standpipe 24 ft. in diameter and 55 ft. high at Stevens, Ky.

CHICAGO, BURLINGTON & QUINCY.—This company plans the construction of a nine-mile spur track from Keensburg, Colo., to Roggen.

HERRIN-BENTON.—This company, with headquarters at East St. Louis, Ill., has applied to the Illinois Commerce Commission for permission to construct a railroad for freight service only from Herrin, Ill., to Benton, a distance of 10 miles.

ILLINOIS CENTRAL.—This company will close bids on November 17 for the construction of a 1,200-ton coaling station at Markham yard, Chicago. This company also has plans for the construction of a 50-stall roundhouse at Markham yard.

ILLINOIS CENTRAL.—This company has awarded contracts for 100 miles of its proposed 165 mile cut-off line from Edgewood, Ill., to Fulton, Ky., as follows: Section No. 1, from Edgewood to the Marion county line, 15 miles, to T. E. Shugart and Blythe Bros.; Section No. 5, from the Big Four crossing to Reevesville, 15 miles, to A. Guthrie, Chicago; Section No. 6, from Reevesville to Metropolis, 15 miles, to the Flick Construction Company, Chicago; Section No. 7, from Metropolis, Ill., to Little Mayfield Creek, Ky., 30 miles, to the Dominion Construction Company; and Section No. 8, from Little Mayfield Creek to Fulton, 25 miles, to the H. W. Nelson Company, Chicago.

LAUREL FORK & MENDOTA.—The Interstate Commerce Commission has made public a proposed report by Attorney Examiner C. E. Boles and Engineer Examiner E. Gray recommending a finding by the commission that the public interest does not require the construction and part acquisition by this company of a line from Saltville to Mendota, Va., 36 miles.

LONG ISLAND.—The New York Transit Commission has ordered the elimination of six grade crossings on the line of this company's Montauk division.

NEW YORK CENTRAL.—This company has awarded to William M. Ballard, Inc., a contract for the extension of five stalls with roof of its enginehouse at Minoa, N. Y., and the construction of an office building at that point; total approximate cost, $50,000. A contract for the installation of a complete blowoff, washing and filling system for locomotive boilers at East Buffalo, N. Y., has been awarded to the National Boiler Washing Company; approximate cost, $40,000.

NORTHERN PACIFIC.—This company plans the construction of a 15-mile extension of its Gray's Harbor, Wash., branch, to cost approximately $500,000.

SOUTHERN.—This company plans the construction of a three-story brick and steel addition to its passenger station at New Orleans, La.

ST. LOUIS-SAN FRANCISCO.—This company contemplates the construction of a freight terminal and warehouse at Birmingham, Ala., to cost approximately $1,000,000.

UNION PACIFIC.—This company, jointly with Los Angeles county, will construct a subway to carry Telegraph road under the Union Pacific tracks to eliminate a grade crossing, at a total cost of $107,500 to be divided equally between the county and the railroad.

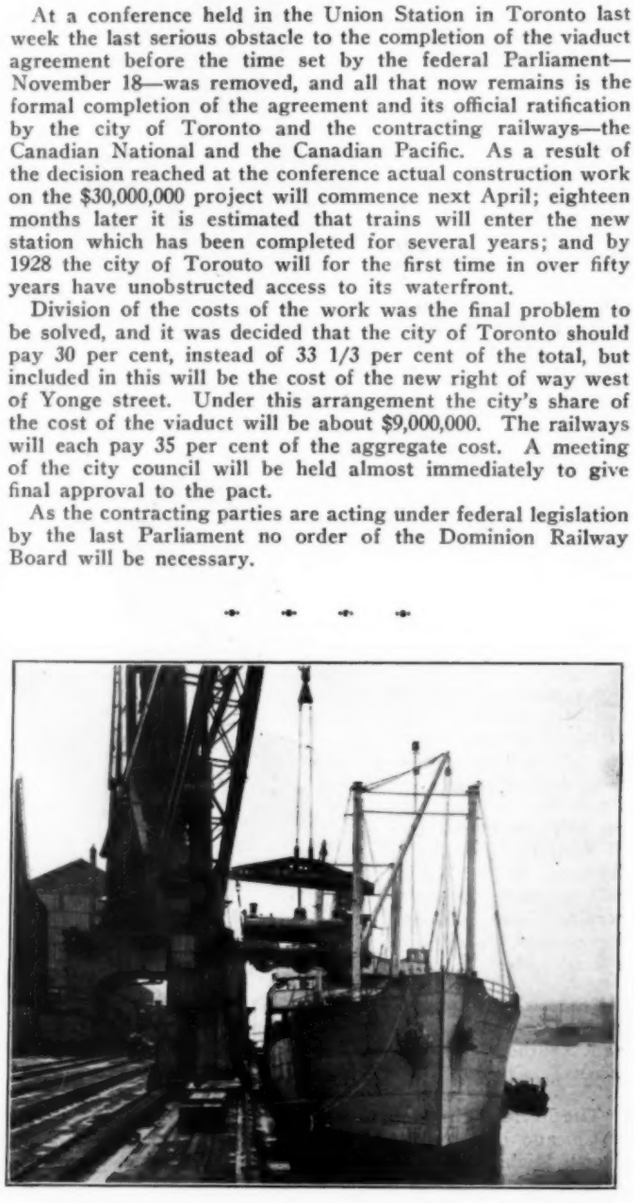
WISCONSIN SOUTHERN.—This company of which C. P. Smith, Fond du Lac, Wis., is president, has awarded a contract to the E. Schuster Construction Company, Denmark, Wis., for the construction of an electric railway from Manitowoc, Wis., to Sturgeon Bay, a distance of approximately 60 miles.

Full Agreement on Toronto Viaduct—Work on $30,000,000 Project to Begin in Spring

At a conference held in the Union Station in Toronto last week the last serious obstacle to the completion of the viaduct agreement before the time set by the federal Parliament—November 18—was removed, and all that now remains is the formal completion of the agreement and its official ratification by the city of Toronto and the contracting railways—the Canadian National and the Canadian Pacific. As a result of the decision reached at the conference actual construction work on the $30,000,000 project will commence next April; eighteen months later it is estimated that trains will enter the new station which has been completed for several years; and by 1928 the city of Torouto will for the first time in over fifty years have unobstructed access to its waterfront.

Division of the costs of the work was the final problem to be solved, and it was decided that the city of Toronto should pay 30 per cent, instead of 33 1/3 per cent of the total, but included in this will be the cost of the new right of way west of Yonge street. Under this arrangement the city's share of the cost of the viaduct will be about $9,000,000. The railways will each pay 35 per cent of the aggregate cost. A meeting of the city council will be held almost immediately to give final approval to the pact.

As the contracting parties are acting under federal legislation by the last Parliament no order of the Dominion Railway Board will be necessary.



Loading Locomotives for Shipment to India at Newcastle-upon-Tyne, England

Railway Financial News

CANADIAN PACIFIC.—*New Director.*—Ross H. McMaster, vice-president of the Steel Company of Canada, has been elected a director to fill the vacancy caused by the death of Lord Shaughnessy. E. W. Beatty, president of the company, succeeded Lord Shaughnessy as chairman in May, last.

DENVER & RIO GRANDE WESTERN.—*Bonds.*—The Interstate Commerce Commission has authorized an issue of $3,000,000 of refunding and improvement mortgage 6 per cent bonds, to be sold to the Western Pacific and the Missouri Pacific in equal amounts at 95 and the proceeds to be used for rehabilitation work.

ILLINOIS CENTRAL.—*Valuation Protest.*—The protest filed with the Interstate Commerce Commission against the tentative valuation recently served claims that the value for any purpose, as of valuation date, of the property used, which the commission gave a valuation for rate-making purposes of $347,680,187, was not less than $858,522,470. For the property wholly owned and used, which the commission gave a valuation for rate-making purposes of $216,409,000, the company says the value was not less than $594,-807,650. The protest contains 490 printed pages, in which the various items of the company's claim as against the figures used by the commission in its report are set up in detail. For one item it is claimed that $64,191,909 has been omitted from the property investment account.

NEW ORLEANS, TEXAS & MEXICO.—*Equipment Trust.*—This company has applied to the Interstate Commerce Commission for authority for an issue of $1,740,000 of 5 per cent equipment trust certificates to be sold at 98.46 to Blair & Co.

NEW YORK CENTRAL.—*New Director.*—Myron C. Taylor, a director of the First National Bank of New York, has been elected to the board of the New York Central to succeed the late James B. Forgan.

PENNSYLVANIA.—*Death of Director.*—C. Stuart Patterson, a director of the Pennsylvania Railroad for over 29 years and the second oldest member, in point of service, on the company's board, died on November 8 at the age of 82.

SOUTHERN.—*Bonds.*—The Interstate Commerce Commission has authorized the authentication and delivery of $5,000,000 of development and general mortgage 4 per cent bonds.

ST. LOUIS-SAN FRANCISCO.—*Notes.*—This company has applied to the Interstate Commerce Commission for authority to issue $3,000,000 of 6 per cent collateral notes, in lieu of a note previously held by the director general of railroads, which has been sold to the Chase Securities Corporation, and to pledge $4,000,000 of prior lien bonds as collateral.

WHEELING & LAKE ERIE.—*Equipment Trust.*—This company has applied to the Interstate Commerce Commission for authority to issue $1,700,000 of 5 per cent prior lien equipment trust certificates, to be sold at not less than 98.50, and $424,000 of 6 per cent deferred lien certificates, to be sold at not less than par; also a three-year promissory note for $424,000 to the Standard Steel Car Company.

Dividends Declared

Chicago & North Western.—Common, 2 per cent, semi-annually; preferred, 3½ per cent, semi-annually; both payable December 31 to holders of record December 1.

Chicago, St. Paul, Minneapolis & Omaha.—Preferred, 5 per cent, payable December 31 to holders of record December 1.

Pittsburgh, Bessemer & Lake Erie.—Preferred, 3 per cent, semi-annually payable December 1 to holders of record November 15.

Pittsburgh, Youngstown & Ashtabula.—Preferred, 1¾ per cent, quarterly, payable December 1 to holders of record November 20.

Trend of Railway Stock and Bond Prices

	Nov. 11	Last Week	Last Year
Average price of 20 representative railway stocks	76.29	72.43	61.26
Average price of 20 representative railway bonds	89.21	88.50	82.65

Railway Officers

Executive

L. R. Gwyn, special assistant to the president of the American Railway Express, has been appointed vice-president in charge of personnel, with headquarters at New York, a newly created position. The title of special assistant to the president has been abolished.

Financial, Legal and Accounting

H. P. Conner has been appointed assistant treasurer of the Long Island, with headquarters at Philadelphia, Pa.

John D. Raynor has been appointed claim agent of the Long Island, with headquarters at New York, succeeding **W. H. Mahler,** who has retired after 31 years of service.

William D. McCaig, whose election as comptroller of the Atlantic Coast Line, with headquarters at Wilmington, N. C., was announced in the *Railway Age* of November 1, was born on January 17, 1874, at Mt. Carmel, Pa. He received a high school education and entered railway service as office boy to the freight claim agent of the Central of Georgia in 1891 and a year later he became a stenographer in the same office. In 1893 he entered the service of the Brunswick & Western (now a part of the Atlantic Coast Line) as a stenographer in the auditor's office and a year later he became a clerk in the office of the auditor of receipts of the Plant System (now also a part of the Atlantic Coast Line). He became traveling auditor of the same system in 1899 and in 1902 he became chief traveling auditor of the Atlantic Coast Line. In 1906 he became auditor of station accounts and in 1911 he was appointed assistant auditor of freight receipts. Mr. McCaig was promoted to assistant comptroller in 1917 and served continually in that capacity until the time of his recent election as comptroller.

W. D. McCaig

Operating

H. Horn, superintendent of track, bridges and buildings of the Alaska Railroad, has been appointed also acting general manager, with headquarters at Anchorage, Alaska, succeeding Lee H. Landis, who has resigned.

F. N. Melius, superintendent of the Hudson division of the New York Central, with headquarters at New York, has been appointed assistant manager, marine department, with the same headquarters. **G. H. Wilson,** assistant superintendent of the electric division, with headquarters at New York, has been promoted to superintendent of the Hudson division, succeeding Mr. Melius.

Traffic

W. C. Schafer has been appointed commercial freight agent of the Western Maryland, with headquarters at Baltimore, Md.

H. T. Bornefeld, city freight agent of the Gulf, Colorado & Santa Fe at Houston, Tex., has been promoted to general

agent, with headquarters at New Orleans, La., succeeding A. Landry, deceased.

R. B. Kinkaid, assistant general freight agent of the Cincinnati, Indianapolis & Western, with headquarters at Indianapolis, Ind., has been promoted to general freight agent, with the same headquarters.

Hugh Harden has been appointed assistant general freight agent of the Illinois Central, with headquarters at Memphis, Tenn., succeeding S. E. Stailey, who has been transferred to Houston, Tex., in charge of a newly established office.

Ewing Duval, general agent of the Chicago Great Western, with headquarters at Kansas City, Mo., has been promoted to assistant general freight agent, with headquarters at St. Joseph, Mo., succeeding C. R. Berry, whose death on September 4 was reported in the *Railway Age* of September 13. **A. W. Nelson,** general agent, with headquarters at St. Louis, Mo., has been transferred to Kansas City, succeeding Mr. Duval. **A. F. Hall,** traffic agent, with headquarters at Tulsa, Okla., has been promoted to general agent, with headquarters at St. Louis, succeeding Mr. Nelson.

Eugene Fox, vice-president in charge of traffic of the El Paso & Southwestern, with headquarters at El Paso, Tex., has been appointed assistant traffic manager of the Southern Pacific, with the same headquarters, in pursuant to the lease of the El Paso & Southwestern by the Southern Pacific. **W. C. Barnes,** traffic manager of the El Paso & Southwestern, has been appointed general freight agent of the Southern Pacific, with headquarters at El Paso. **E. J. Fenchurch,** assistant general freight and passenger agent of the Southern Pacific, with headquarters at Tucson, Ariz., has been appointed general freight and passenger agent at Tucson. **Russell P. Kyle,** general agent of the El Paso & Southwestern at Phoenix, Ariz., has been appointed district freight and passenger agent of the Southern Pacific, with the same headquarters, succeeding Dick Smith, transferred.

Engineering, Maintenance of Way and Signaling

George A. Noren, whose promotion to designing engineer of the New York Central, with headquarters at New York, was announced in the *Railway Age* of November 1, was born on April 6, 1886, at New Britain, Conn. He was graduated from the University of Pennsylvania in 1910 and entered railway service in June of that year as a rodman for the Pennsylvania. In October of the next year he left railway service to become assistant engineer for the Monterey Electric Railway Light & Power Company, Monterey, Mexico, and in May, 1912, he entered private practice in general engineering at Monterey. Later in the same year he re-entered railway service as assistant engineer on the four-tracking improvement on the Hudson River division of the New York Central and in February, 1916, he became assistant engineer on the preliminary and final location of the river crossing and west approaches for the Hudson River Connecting Railroad (now a part of the New York Central) near Castleton, N. Y. He was promoted to resident engineer of the New York Central at Poughkeepsie, N. Y., on station improvements in December, 1916, and in April of the following year he was promoted to assistant district engineer of the Eastern district. In February, 1920, Mr. Noren was promoted to engineer of grade crossings, with headquarters at New York, which position he held until the time of his recent promotion to designing engineer.

G. A. Noren

Mechanical

C. F. Parker has been appointed master mechanic of the Kansas City Southern, with headquarters at Heavener, Okla., succeeding F. A. Prewitt, deceased.

John B. Icsman has been appointed master mechanic of the Lehigh & Hudson River, with headquarters at Warwick, N. Y., succeeding R. T. Jaynes, deceased.

E. E. Arnold, general car inspector of the Southern district of the Missouri Pacific, with headquarters at Little Rock, Ark., has been appointed superintendent of the De Soto, Mo., shops.

G. H. Warning has been appointed master mechanic of the Saskatchewan district of the Canadian National, with headquarters at Regina, Sask., succeeding H. R. Simpson, who died on October 20.

B. M. Brown, superintendent of motive power and equipment of the Southern Pacific, Louisiana lines, with headquarters at Algiers, La., has been promoted to chief assistant superintendent of motive power of the lines in Texas and Louisiana, with headquarters at Houston, Tex. He succeeds R. U. Lipscomb, whose promotion to superintendent of motive power of the newly created Eastern district of the Pacific system was reported in the *Railway Age* of November 8.

Obituary

R. T. Jaynes, master mechanic of the Lehigh & Hudson River, with headquarters at Warwick, N. Y., died on November 4, having been in poor health for several months.

Edward H. Utley, vice-president and general manager of the Bessemer & Lake Erie, with headquarters at Pittsburgh, Pa., died at his home in that city on November 8, following a long illness. Mr. Utley was born at Wadsworth, Ohio, and was educated in the public schools of Wisconsin. He entered railway service as a station agent for the Chicago, Milwaukee & St. Paul at Granville, Wis., and was later transferred to Randolph, Wis. He also served as a telegraph operator for the Pacific & Atlantic Telegraph Company at Philadelphia, Pa., and Pittsburgh, and later became operator in the superintendent's office of the Chicago division of the Chicago, Milwaukee & St. Paul. In June, 1875, he became operator and clerk in the president's office of the Allegheny Valley (now a part of the Pennsylvania) and on April 1, 1880, he became secretary of the same company. He also served as general freight agent and general passenger agent of that company. On June 1, 1889, he entered the service of the Carnegie Steel Company as general freight agent at Pittsburgh and on June 1, 1891, he entered the sales department of the same company. On June 1, 1897, he entered the service of the Pittsburgh, Bessemer & Lake Erie as general freight and passenger agent and on June 15, 1901, he became general manager of the Bessemer & Lake Erie. Mr. Utley became vice-president and general manager on January 15, 1904, and served continually in that capacity until the time of his death.

Anyone Who Wishes to be Whole and live, will "look out for the cars" before crossing a railroad whether the gates are closed or open, whether the attendant is or is not doing his duty. This, says the Pittsburgh (Pa.) Gazette-Times, in its comment on the recent distressing street car disaster at Chicago, is a plain duty. Continuing, the editorial says: The railroads should be made to pay commensurately for all the damage they do where responsibility can fairly be fastened on them. But in the Chicago case safety gates were provided, with a man to operate them. That man failed at the crucial moment. He admits he had had a few drinks. Was the street car operative justified in relying on a watchman for safety? . . . There is no satisfaction in finding who is to blame for crossing accidents if nothing is done to make them less likely in the future. It is plain that safety will not be assured for any motorist or pedestrian who does not take safety measures on his own account. . . .